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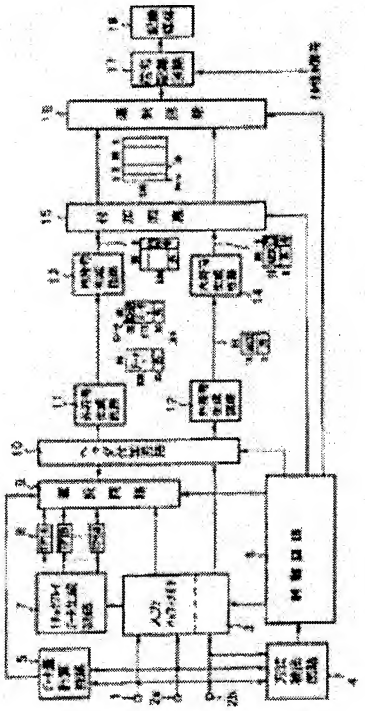
(54) METHOD AND DEVICE FOR RECORDING DIGITAL SIGNAL AND RECORDING MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To make common a circuit for recording a digital signal for specific reproduction on a track at the time of recording a format, and to simplify a circuit constitution by making the same the recording areas of the digital signals for specific reproduction at the time of recording any first and second format.
SOLUTION: When data for normal reproduction in a first system are inputted to an input terminal 1, or when the data for normal reproduction in a second system and an auxiliary signal are respectively inputted to input terminals 2a and 2b, those data are written in a buffer memory 3, and the system is detected by a system detecting circuit 4, and a data amount is calculated by a data amount calculating circuit 5. In this recording device, at the time of recording any first and second system digital signal, the data amount necessary for data for specific reproduction is made the same in the case of the same kind of data for specific reproduction. Thus, a trick play data circuit generating circuit 7 can be shared by the first and second systems, and this circuit can be simplified.



CLAIMS

[Claim(s)]
[Claim 1]An input means which inputs the 1st and 2nd digital information signals, and a signal processing means which processes said 1st and 2nd digital information signals to a synthetic information signal, A channel coding means to give a channel coding step about said synthetic information signal, and to acquire a channel coding synthetic information signal, Having a recording device which writes said channel coding synthetic information signal in the 1st track portion in inclined tracks on a recording medium with said recording rate of said recording medium, said 1st digital information signal is the refreshable information for ordinary reproduction in reproduction speed equal to said recording rate at playback equipment.
Said 2nd digital information signal is n1 time (n1 is an integer and) of said recording rate with said playback equipment. 0 and 1 -- it is not -- with a data block of said channel coding synthetic information signal which is the refreshable information for special reproduction at an equal special reproduction speed, and accomplishes a data block of said 1st digital information signal. [and] In a digital signal recorder which can carry out generation record of the data block of said channel coding synthetic information signal which accomplishes a data block of said 2nd digital information signal selectively at said 1st track portion, The 1st recording mode that records said channel coding synthetic information signal on said 1st track portion of said track, It faces recording the 3rd channel coding digital information signal and digital auxiliary signal on the 2nd track portion and the 3rd track portion which are within the limits of said 1st track portion of said track, Record said 3rd channel coding digital information signal on the 2nd track portion of said track, and have the 2nd recording mode that records said digital auxiliary signal on the 3rd track portion of said track, and in said 2nd recording mode to said input means. They are inputted by the 3rd digital information signal and said auxiliary signal, and said channel coding means, Carry out channel coding of the 3rd digital information signal to said 3rd channel coding digital information signal, and said recording device, With said recording rate of said recording medium, the 3rd [said] channel coding digital information signal and said auxiliary signal are recorded on the said 2nd and 3rd track portions, respectively, A data block of said channel coding synthetic information signal with which said channel coding synthetic information signal accomplishes a data block of said 2nd digital information signal is recorded on said 2nd track portion, A digital signal recorder which carries out that generation record is carried out to said 1st track portion with the feature so that it may not be recorded on said 3rd track portion.

[Claim 2]Said 2nd [the] of said track and the 3rd track portion are separated about an edit gap. The digital signal recorder according to claim 1 which the length of the sum total of the said 2nd

and 3rd track portions and said edit gap makes parenchyma etc. the length of said 1st track portion, is in it, and is characterized by things.

[Claim 3]Said 3rd track portion is located before said 2nd track portion on a track.
The digital signal recorder according to claim 1 or 2, wherein said head of the 3rd track portion obtained at the time of said 2nd recording mode serves as a substantial identity position in a head of said 1st track portion and a longitudinal direction of a track which are obtained at the time of said 1st recording mode.

[Claim 4]A digital signal recorder of Claims 1-3, wherein said n1 is which value of 4, 12, or 24 given in any 1 paragraph.
[Claim 5]The digital signal recorder according to claim 1 having further a means to acquire said 2nd digital information signal from said 1st digital information signal.
[Claim 6]A recording medium being obtained by said which claim with a digital signal recorder of a description.
[Claim 7]An input step which inputs the 1st and 2nd digital information signals, and a signal-processing step which processes said 1st and 2nd digital information signals to a synthetic information signal, A channel coding step which performs channel coding to said synthetic information signal in order to acquire a channel coding synthetic information signal, It has a record step which writes said channel coding synthetic information signal in the 1st track portion in inclined tracks on a recording medium with said recording rate of said recording medium, Said 1st digital information signal is the refreshable information for ordinary reproduction in reproduction speed equal to said recording rate at playback equipment.
Said 2nd digital information signal is n1 time (n1 is an integer and) of said recording rate with said playback equipment. 0 and 1 -- it is not -- with a data block of said channel coding synthetic information signal which is the refreshable information for special reproduction at an equal special reproduction speed, and accomplishes a data block of said 1st digital information signal. [and] In a digital signal record method which can carry out generation record of the data block of said channel coding synthetic information signal which accomplishes a data block of said 2nd digital information signal selectively at said 1st track portion, The 1st recording mode that records said channel coding synthetic information signal on said 1st track portion of said track, It faces recording the 3rd channel coding digital information signal and digital auxiliary signal on the 2nd track portion and the 3rd track portion which are within the limits of said 1st track portion of said track, Record said 3rd channel coding digital information signal on the 2nd track portion of said track, and have the 2nd recording mode that records said digital auxiliary signal on the 3rd track portion of said track, and in said 2nd recording mode in said input step. They are inputted by the 3rd digital information signal and said auxiliary signal, and in said channel coding step. Channel coding is carried out to said 3rd channel coding digital information signal by the 3rd digital information signal, and in said record step. With said recording rate of said recording medium, the 3rd [said] channel coding digital information signal and said auxiliary signal are recorded on the said 2nd and 3rd track portions, respectively, A data block of said channel coding synthetic information signal with which said channel coding synthetic information signal accomplishes a data block of said 2nd digital information signal is recorded on said 2nd track portion, A digital signal record method which carries out that generation record is carried out to said 1st track portion with the feature so that it may not be recorded on said 3rd track portion.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the method of starting a digital signal record method, a recorder, and a recording medium, especially recording the digital signal for ordinary reproduction and the digital signal for special reproduction of two or more kinds of methods on a tape shaped recording medium by a rotary head, and its recorder and recording medium.
[0002]
[Description of the Prior Art]When recording a digital signal on tape shaped recording media, such as magnetic tape, by a rotary head and playing this generally, a digital signal is recorded per data block and it plays. At the time of the trick play reproduction (special reproduction) which reproduces a digital signal at a different speed from the time of record on the other hand. Since the scanning locus of the rotary head on a tape shaped recording medium differs from the time of ordinary reproduction, if the discontinuous record data for ordinary reproduction for every time interval of a certain will be reproduced and it remains as it is, it is difficult to acquire a trick play regenerative signal.
[0003]Therefore, by replacing the digital signal for special reproduction with the digital signal for ordinary reproduction, and carrying out arrangement record on the scanning locus of the rotary head at the time of special reproduction, all over the track with which the digital signal for ordinary reproduction was recorded conventionally, The digital signal record method which made special reproduction possible is known (for example, JP,H6-261278,A: Title of invention "signal recording and reproducing device").
[0004]
[Problem(s) to be Solved by the Invention]However, in the above-mentioned conventional digital signal record method. Since the recording format of the digital signal recorded on each track of a tape shaped recording medium is constant, For example, record of the digital signal of a desired method cannot be performed with one device in various formats, such as a format which established mutual independently two or more data areas in which record reproduction is possible in one track.
[0005]When it is intermingled and the digital signal for ordinary reproduction and the digital signal for special reproduction are recorded on a recording medium, Since the recording formats of a digital signal differ, if the data volume of the digital signal for special reproduction differs from the locating position of the digital signal for special reproduction, The circuit for recording the composition and the digital signal for special reproduction of a generating circuit of the digital signal for special reproduction on the specific position of a tape shaped recording medium will be complicated.
[0006]This invention was made in view of the above-mentioned point, and an object of this invention is to provide the recording medium recorded by that cause as the digital signal record method and recorder which can record the digital signal intermingled in the digital signal for ordinary reproduction, and the digital signal for special reproduction in a mutually different

format.

[0007]When other purposes of this invention are intermingled and record the digital signal for ordinary reproduction, and the digital signal for special reproduction on a recording medium, Even if the methods of record track format differ, it is in providing the recording medium recorded by that cause as the digital signal record method and recorder which can simplify the generating circuit and record circuit of the digital signal for special reproduction.

[0008]

[Means for Solving the Problem]In order to attain the above-mentioned purpose, the digital signal recorder according to claim 1, An input means which inputs the 1st and 2nd digital information signals, and a signal processing means which processes said 1st and 2nd digital information signals to a synthetic information signal, A channel coding means to give a channel coding step about said synthetic information signal, and to acquire a channel coding synthetic information signal, It has a recording device which writes said channel coding synthetic information signal in the 1st track portion in inclined tracks on a recording medium with said recording rate of said recording medium, With reproduction speed equal to said recording rate at playback equipment, said 1st digital information signal is the refreshable information for ordinary reproduction, and said 2nd digital information signal, A data block of said channel coding synthetic information signal which is the refreshable information for special reproduction at a special reproduction speed equal to n1 time (n1 is an integer and is not 0 and 1) of said recording rate at said playback equipment, and accomplishes a data block of said 1st digital information signal, In a digital signal recorder which can carry out generation record of the data block of said channel coding synthetic information signal which accomplishes a data block of said 2nd digital information signal selectively at said 1st track portion, The 1st recording mode that records said channel coding synthetic information signal on said 1st track portion of said track, It faces recording the 3rd channel coding digital information signal and digital auxiliary signal on the 2nd track portion and the 3rd track portion which are within the limits of said 1st track portion of said track, Record said 3rd channel coding digital information signal on the 2nd track portion of said track, and. Have the 2nd recording mode that records said digital auxiliary signal on the 3rd track portion of said track, and in said 2nd recording mode to said input means. The 3rd digital information signal and said auxiliary signal are inputted, said channel coding means carries out channel coding of the 3rd digital information signal to said 3rd channel coding digital information signal, and said recording device is said recording rate of said recording medium, Record the 3rd [said] channel coding digital information signal and said auxiliary signal on the said 2nd and 3rd track portions, respectively, and said channel coding synthetic information signal, A data block of said channel coding synthetic information signal which accomplishes a data block of said 2nd digital information signal is recorded on said 2nd track portion, Generation record was made to be carried out at said 1st track portion so that it might not be recorded on said 3rd track portion.

[0009]In the digital signal recorder according to claim 2. It dissociates about an edit gap and said 2nd [the] of said track and the 3rd track portion are characterized by a done thing by which

parenchyma etc. spread the length of the sum total of the said 2nd and 3rd track portions and said edit gap on the length of said 1st track portion.
[0010]In the digital signal recorder according to claim 3. Said head of the 3rd track portion which said 3rd track portion is located before said 2nd track portion on a track, and is obtained at the time of said 2nd recording mode, In a head of said 1st track portion and a longitudinal direction of a track which are obtained at the time of said 1st recording mode, it was considered as a substantial identity position.
[0011]The digital signal recorder according to claim 4 made said n1 which value of 4, 12, or 24.
[0012]The digital signal recorder according to claim 5 was further provided with a means to acquire said 2nd digital information signal from said 1st digital information signal.
[0013]The recording medium according to claim 6 is characterized by being the recording medium obtained by the above digital signal recorders.
[0014]In the digital signal record method according to claim 7. An input step which inputs the 1st and 2nd digital information signals, and a signal-processing step which processes said 1st and 2nd digital information signals to a synthetic information signal, A channel coding step which performs channel coding to said synthetic information signal in order to acquire a channel coding synthetic information signal, It has a record step which writes said channel coding synthetic information signal in the 1st track portion in inclined tracks on a recording medium with said recording rate of said recording medium, With reproduction speed equal to said recording rate at playback equipment, said 1st digital information signal is the refreshable information for ordinary reproduction, and said 2nd digital information signal, It is the refreshable information for special reproduction at a special reproduction speed equal to n1 time (n1 is an integer and is not 0 and 1) of said recording rate at said playback equipment, A data block of said channel coding synthetic information signal which accomplishes a data block of said 1st digital information signal, In a digital signal record method which can carry out generation record of the data block of said channel coding synthetic information signal which accomplishes a data block of said 2nd digital information signal selectively at said 1st track portion. The 1st recording mode that records said channel coding synthetic information signal on said 1st track portion of said track, It faces recording the 3rd channel coding digital information signal and digital auxiliary signal on the 2nd track portion and the 3rd track portion which are within the limits of said 1st track portion of said track, Record said 3rd channel coding digital information signal on the 2nd track portion of said track, and. Have the 2nd recording mode that records said digital auxiliary signal on the 3rd track portion of said track, and in said 2nd recording mode in said input step. They are inputted by the 3rd digital information signal and said auxiliary signal, and in said channel coding step. Channel coding is carried out to said 3rd channel coding digital information signal by the 3rd digital information signal, and in said record step. With said recording rate of said recording medium, they are recorded on the said 2nd and 3rd track portions by the 3rd [said] channel coding digital information signal and said auxiliary signal, respectively, and said channel coding synthetic information signal, Generation record is carried out at said 1st track portion so that a data block of said channel coding synthetic information

signal which accomplishes a data block of said 2nd digital information signal may be recorded on said 2nd track portion and may not be recorded on said 3rd track portion.

[0015]

[Example]Next, working example of this invention is described with reference to Drawings. Drawing 1 shows the block diagram of the recorder for describing the digital signal record method and one working example of a recorder which become this invention. The digital signal for ordinary reproduction of the 1st method recorded on the input terminal 1 by the 1st track format in the figure. (It is also hereafter called the data for ordinary reproduction) is inputted, and the data for ordinary reproduction of the 2nd method recorded by the 2nd track format is inputted into the input terminal 2a, The ancillary data (AUX) by which record reproduction is independently carried out to the data for ordinary reproduction of the 2nd method during the 2nd track format is inputted into input terminal 2b. There are an audio signal and others as this ancillary data.

[0016]Here the digital signal in this example, By two rotary heads which countered the solid of revolution 180 degrees and were provided and from which an azimuth angle differs mutually. It shall be recorded on the track formed by the helical scan magnetic recorder and reproducing device (VTR) of composition of carrying out record reproduction to the magnetic tape it is aslant wound in the angle range of about 180 degrees covering the peripheral side face of a solid of revolution, and runs with constant speed. Each track is constituted by arranging two or more a constant rate of data areas called the sink block equivalent to the above mentioned data block according to the scan of a rotary head.

[0017]Drawing 2 shows the format of an example of this sink block. As shown in the figure, the sink block which is a data block The field 21 of 2 bytes of synchronized signal (Sync) for reproduction of the sink block, The field 22 of 3 bytes of address information (ID), and 3 bytes of header storing region 23 which stores various information, 96 bytes of data storing region 24 and the field 25 of 8 bytes of parity for the error correction of the information on this sink block are 112 bytes of composition in all that were compounded serially. In this example. For example, it records on the above-mentioned data storing region 24 by using the digital signal in the transport packet (TP) transmission system of MPEG 2 (Moving Picture Experts Group 2), etc. as the data for ordinary reproduction, or the data for special reproduction.

[0018]Two or more these sink blocks are compounded serially, and one track is formed. At the time of digital signal record of said 1st method, this track format is formed by the 1st track format shown in drawing 3, and is formed by the 2nd track format shown in drawing 4 at the time of the digital signal of said 2nd method, and auxiliary signal record.

[0019]The 1st track format shown in drawing 3, It consists of the margin region 31, the preamble field 32, the sub-code field 33, the postamble field 34, the IBG field 35, the preamble field 36, the data area 37, the error correcting code field 38, the postamble field 39, and the margin region 40. Here, the data area 37 is a field where digital signal (data for ordinary reproduction or data for special reproduction) DATA1 [306-sink block] of the 1st method is recorded among the data area 37 which constitutes main data areas, and the error correcting code field 32. The error

correcting code field 38 is a field where numerals (C3 numerals) are recorded in the outside for an error correction, and consists of 30 sink blocks.

[0020]On the other hand, the 2nd track format shown in drawing 4 is the track format the digital signal of the 2nd method, and for auxiliary signals, and has given identical codes to drawing 3 and an identical configuration portion. The 2nd track format shown in this drawing 4, The margin region 31, the preamble field 32, the sub-code field 33, the postamble field 34, the IBG field 35, the preamble field 36, the 1st data area 41, the postamble field 42, the IBG field 43, the preamble field 44, the 2nd data area 45, It consists of the error correcting code field 46, the postamble field 39, and the margin region 40.

[0021]Here, the 1st data area 41, postamble field 42, IBG field 43, preamble field 44, and 2nd data area 45 comprise 306 same sink blocks as the data area 37 of drawing 3. Before long, the 1st data area 41 is a field where said auxiliary signal AUX is recorded, and consists of 23 sink blocks. The postamble field 42, the IBG field 43, and the preamble field 44 are two sink blocks, three sink blocks, and one sink block, respectively, and constitute the gap area for edit of six sink blocks as a whole.

[0022]The 2nd data area 45 is a field where digital signal (data for ordinary reproduction or data for special reproduction) DATA2 [277-sink block] of the 2nd method is recorded. The error correcting code field 46 is a field where numerals (C3 numerals) are recorded in the outside for the error correction of digital signal DATA2 of the 2nd method, The error correcting code of 30 sink blocks generated from DATA2 of 277 sink blocks and the data of a total of 306 sink blocks which used 29 sink blocks as zero data is recorded.

[0023]Again, it returns and explains to drawing 1. When the data for ordinary reproduction of the 1st method is inputted into the input terminal 1, this data for input ordinary reproduction is written in the input buffer memory 3, and that data volume (data rate) is calculated by a method being detected in the method detector circuit 4, and the data volume calculation circuit 5 being supplied. On the other hand, when the 2nd data for ordinary reproduction and auxiliary signal of a method are supplied to the input terminal 2a and 2b, respectively, The data for ordinary reproduction and the auxiliary signal of these 2nd methods are supplied and written in the input buffer memory 3, respectively, The data volume (data rate) is calculated by the method detector circuit 4 being supplied, and a method being detected, and also the data for ordinary reproduction of the 2nd method being supplied to the data volume calculation circuit 5.

[0024]According to the method detected by the method detector circuit 4, the control circuit 6 generates and outputs various kinds of signals, such as a reading control signal of the buffer memory 8, a selection signal of the selection circuitry 9, header information, a synchronized signal, and address information. The data volume detector circuit 5 calculates the data rate of the inputted data for ordinary reproduction, It detects where [of the data rate range which set up data volume (data rate) as compared with some reference values defined beforehand] it enters, the selection signal according to the detection data rate is generated, and it outputs to the below-mentioned selection circuitry 9.

[0025]After the data for the ordinary reproduction of the 1st method or the 2nd method is stored

in the input buffer memory 3, it is read by the reading control signal from the control circuit 6, and is supplied to the trick play data generating circuit 7.
On the other hand, the selection circuitry 9 is supplied.
When the auxiliary signal is stored in the input buffer memory 3, the header additional circuit 10 is supplied. The trick play data generating circuit 7 generates six kinds of data for trick plays (for special reproduction) later mentioned based on input ordinary reproduction data, 4 bytes of additional information (for example, the arrival time of a packet and other information) are used as an ADISHONARU header, multiplex is carried out to these, these six kinds of data are outputted in parallel, and it writes in the buffer memory 8 (TP1 B-TP 6B) for exclusive use, respectively. The kind with the same above-mentioned data for special reproduction of thing is an identical configuration in both [at the time of digital signal record of the 1st and 2nd methods] cases.
[0026]Each stored data of the six above-mentioned buffer memories 8 (TP1 B-TP 6B) is read based on the reading control signal from the control circuit 6, and is inputted into the selection circuitry 9. The selection circuitry 9 chooses the above-mentioned data for ordinary reproduction, and the data of one of six kinds of data TP1-TP6 for special reproduction based on both the switching signal from the control circuit 6, and the selection signal from the data volume calculation circuit 5, and supplies them to the header additional circuit 10.
[0027]Namely, in the specific turn defined beforehand, the selection circuitry 9 chooses the data of one of the data for ordinary reproduction, and six kinds of data TP1-TP6 for special reproduction, and outputs it one by one, And at the time of the output of the digital signal for the special reproduction of one kind of six kinds of inside, either the data for special reproduction or the data for ordinary reproduction is chosen and outputted according to the data rate of the ordinary reproduction data detected by the data volume calculation circuit 5. It replaces with the low-priority data for special reproduction, for example among TP1-TP6, and the data for ordinary reproduction is chosen as the data rate of the data for ordinary reproduction becomes high at this time.
[0028]The selection circuitry 9 at the time of the selected output of the data TP2-TP6 for special reproduction. Without being overlapped, it overlaps and two or more data blocks of the data for special reproduction recorded by overlapping choose a part so that it may be arranged before and behind two or more data blocks of the data for special reproduction recorded only once, so that it may mention later.
[0029]The time series complex data which consists of the data for ordinary reproduction outputted from the selection circuitry 9, the data TP1-TP6 for special reproduction, or these parts is supplied to the header additional circuit 10, and 3 bytes of header information from the control circuit 6 are added to the head. . This header information is the header information shown in drawing 2 by 23, and arrangement record of six kinds of data TP1-TP6 for special reproduction was carried out in this example in the specific area which the tape shaped recording medium 18 appointed beforehand. For example, the map information which shows that it is a **** track pattern shown in drawing 5, The information for making it identify which [of the data TP1-TP6

for special reproduction and the data for ordinary reproduction] to be chosen and recorded on six kinds of data TP1 for special reproduction - TP6 recording area is included at least.
[0030]99 bytes of digital signal which consists of the header and the data for ordinary reproduction, or the data for special reproduction taken out from this header additional circuit 10, A part for the sink block which is supplied to the outside code generating circuits 11, and is recorded on the data area of one track here (by the 1st method, by 306 sink blocks of the data area 37 of drawing 3) The 2nd method shows numerals outside 30 sink blocks as an error correcting code when inputted by 277 sink blocks of the data area 45 of drawing 4.
[0031]However, the outside code generating circuits 11 in the 2nd method. To the input digital signal for 277 sink blocks. The outside numerals which receive the data for a total of 306 sink blocks which added zero data for 29 sink blocks equivalent to 29 sink blocks which consist of the 1st data area 41, postamble field 42, IBG field 43, and preamble field 44 of drawing 4 are generated. Outside [this] numerals are recorded on the error correcting code field 38 of drawing 3 at the time of digital signal record of the 1st method, and are recorded on the error correcting code field 46 of drawing 4 at the time of digital signal record of the 2nd method.
[0032]Thus, the digital signal which consists of the outside numerals, the data, and the header which were generated by the outside code generating circuits 11 is supplied to the inner code generating circuit 13, and 8 bytes of parity is generated as an inner code per 99 bytes. The header and auxiliary signal which were taken out from the header additional circuit 10, After being inputted into the outside code generating circuits 12 and generating numerals outside five sink blocks every 18 sink blocks, the ancillary data of these 23 sink block is supplied to the inner code generating circuit 14, and 8 bytes of parity is generated as an inner code per 99 bytes.
[0033]The digital signal (data, a header, outside numerals, and inner code) containing the inner code generated in the inner code generating circuits 13 and 14, respectively, After 3 bytes of address information etc. which were shown by 2 bytes of synchronized signal which the additional circuit 15 was supplied, respectively and was shown in drawing 2 by Sync, or ID are added and being generated by the sink block, the selection circuitry 16 is supplied by a sync block unit. When the data for ordinary reproduction of the 1st method is inputted into the input terminal 1 based on the output selection signal of the control circuit 6, the selection circuitry 16, The sink block containing the 1st ordinary reproduction data or data for special reproduction of a method inputted respectively through the inner code generating circuit 13 and the additional circuit 15 is chosen, When the 2nd data for ordinary reproduction and auxiliary signal of a method are inputted into the input terminal 2a and 2b, respectively, The sink block containing the data for ordinary reproduction of the 2nd method inputted respectively through the inner code generating circuit 13, or 14 and the additional circuit 15, the data for special reproduction, or ancillary data is chosen.
[0034]The preamble recorded on the fields 32, 33, 34, 39, 42, and 44 etc. which showed the output signal of the selection circuitry 16 to drawing 3 and drawing 4 in the signal recording circuit 17, After multiplex [of a sub-code, the postamble, etc.] is carried out and also being become irregular and amplified, it is recorded on the recording medium (here magnetic tape) 18

by the charting machine using the publicly known rotary head which is not illustrated. This forms a track pattern as shown in drawing 5, and the data for ordinary reproduction and the data TP1-TP6 for special reproduction are recorded. It replaces with some or all of the data TP1-TP6 for special reproduction according to the data rate of the data for ordinary reproduction, and the data for ordinary reproduction is recorded.

[0035]At the time of digital signal record of the 2nd method, only one side of the auxiliary signal inputted into input terminal 2b as the data for ordinary reproduction of the 2nd method and the data for special reproduction which were inputted into the input terminal 2a is recordable independently.

[0036]Next, the track pattern of one working example of the recording medium of this invention is explained with drawing 5. Drawing 5 shows 24 pair track (48 tracks) recorded by the 1st rotary head of + azimuth angle, and the 2nd rotary head of - azimuth angle, Each of each track shows 336 sink blocks which consist of the data area 37 shown in drawing 3, and the error correcting code field 38, or 336 sink blocks from the 1st data area 41 shown in drawing 4 to the error correcting code field 46.

[0037]Arrangement record of the data TP1-TP6 for special reproduction is carried out at the specific position defined beforehand so that drawing 5 may show, but. The record range is set as the 2nd data area 45 of 277 sink blocks except the gap for edit of six sink blocks which consist of the 1st 23 sink blocks and fields 42-44 of the data area 41 of drawing 4, and the error correcting code field 46 of 30 sink blocks. Therefore, the data TP1-TP6 for special reproduction is recorded on a part of 277 sink blocks within the limits also excluding [the time of digital signal record of the 1st method] 29 top sink blocks among the data areas 37 of 306 sink blocks of drawing 3.

[0038]In this working example. A 4X forward direction. Data TPof ** 1st 1 for special reproduction of (4x), a 12X forward direction. Data TPof ** 2nd 2 for special reproduction of (12x), data TPof ** 3rd of 24X (24x) forward direction 3 for special reproduction, 4th data TP4 [of a 4X (-4x) opposite direction] for special reproduction, and data TPof ** 5th of 12X (-12x) opposite direction 5 for special reproduction. And the 6th [of a 24X (-24x) opposite direction] data TP6 for special reproduction is recorded on the specific position defined beforehand.

[0039]45 sink blocks and the 2nd data TP2 for special reproduction the 1st data TP1 for special reproduction 46 sink blocks, 14 sink blocks and 4th data TP4 for special reproduction are constituted data TPof ** 3rd 3 for special reproduction, and 23 sink block and data TPof ** 6th 6 for special reproduction comprises 13 sink blocks 58 sink block and data TPof ** 5th 5 for special reproduction. The block length of these data for special reproduction is set as the length which a rotary head can reproduce even if some track gap arises at the time of a trick play.

[0040]In drawing 5, the portion by which arrangement record of the data TP1-TP6 for special reproduction is not carried out shows the track portion on which the data for ordinary reproduction is recorded. The portion shown with the white ground of [TP2-TP6] the data TP1-TP6 for special reproduction shows the sink block recorded by overlapping twice.

[0041]When the number of sink blocks of each of above-mentioned data for special reproduction in the track pattern of drawing 5 explained above, a recording data rate, a reproduction data rate,

etc. are summarized, it comes to be shown in the following table. However, SB is the abbreviation for a sink block among following front, and 1SB is calculated as average value here as what is 94 bytes.

[0042]

[Table 1]

倍速比	バースト/スキャン	SB(a)/スキャン	SB(b)/スキャン	記録SB/TPF	再生SB/スキャン	記録データレート(kbps)	再生データレート(kbps)
+4	2	45	0	90	90	507.6	2.03
+12	3	14	16	138	90	259.44	2.03
+24	9	6	4	126	90	118.44	2.03
−4	2	32	13	116	90	654.24	2.03
−12	5	13	5	115	90	216.2	2.03
−24	9	7	3	117	90	109.98	2.03

The number of sink blocks which it overlaps in the data block for special reproduction, and does not record SB (a), the number of sink blocks which it overlaps in the data block for special reproduction, and records SB (b), and TPF mean a trick play frame among the above-mentioned table, and a scan means one rotation of solids of revolution, such as a rotating drum. the time of recording altogether, six kinds of data TP1-TP6 for special reproduction like drawing 5, as shown in Table 1 -- all the data for special reproduction -- per second -- since it is recorded at a rate of 2481.25SB, the rate of occupying in total record data volume (60x306 (SB/s)) serves as 13.5%. The data rates which can record the data for ordinary reproduction at this time are 11.9Mbps.

[0043]In this example, it is premised on that the data rate of the data for ordinary reproduction may change, and when the data rate of the data for ordinary reproduction becomes higher than 11.9Mbps, according to it, the record data volume of the data for special reproduction is reduced. There is the method of reducing when reproducing as the method of this reduction from what has a low priority among the data TP1-TP6 for special reproduction, for example.

[0044]In this case, for example, the 24X data TP3 and TP6 for special reproduction has the lowest priority, Hereafter, if a priority shall become high in the order of data TP4 [of a 4X opposite direction] for special reproduction, and data TPof 4X forward direction 1 for special reproduction, data TPof 12X opposite direction 5 for special reproduction, and data TP2 for the special reproduction of a 12X forward direction, Record of the data for special reproduction is omitted in order of **TP3 and TP6, **TP4, **TP1, **TP5, and **TP2, all records of the data for special reproduction are omitted eventually, and only the data for ordinary reproduction is recorded as the data rate of the data for ordinary reproduction becomes higher than 11.9Mbps.

[0045]If the data for special reproduction in which it is recorded in this case, the rate that the data for special reproduction occupies, and the data rate of the recordable data for ordinary reproduction are shown collectively, it will become as it is shown in the following table.

[0046]

[Table 2]

記録される特殊再生データ	特殊再生データが占める割合（%）	記録可能な通常再生データレート(Mbps)
無し	0	13．8
TP2	1．9	13．5
TP2, TP5	3．4	13．3
TP2, TP5, TP1	7．1	12．8
TP2, TP5, TP1, TP4	11．9	12．2
TP2, TP5, TP1, TP4, TP3, TP6	13．5	11．9

However, the ordinary reproduction data rate in which record reproduction is possible is a data rate of the data for input ordinary reproduction of the 1st method recorded in the 1st format among the above-mentioned table 2.
The data for ordinary reproduction of the 2nd method recorded in the 2nd format becomes less than this about 1.31 Mbps (= (23+6) SB / track x60 track / sx94 Byte/SBx8 bit/Byte).

[0047]Since it is the same in this example in the case of the kind with same data volume required for the data TP1-TP6 for special reproduction of data for special reproduction also when recording which of the digital signal of the 1st method, and the digital signal of the 2nd method, The trick play data generating circuit 7 which generates the data for special reproduction can be shared to digital signal record of the 1st and 2nd methods, and, therefore, a circuit can be simplified.
[0048]Since the record locating position of the data TP1-TP6 for special reproduction is immobilization in this example as shown in drawing 5 also when recording which of the digital signal of the 1st method, and the digital signal of the 2nd method, The burden of the circuit for carrying out arrangement record of the data TP1-TP6 for special reproduction can be managed with a general way on a track.
[0049]Next, the composition and operation of digital signal playback equipment which reproduce the recording medium of this invention are explained with drawing 6. The recording media 51 are the above-mentioned recording medium 18 and a recording medium which has a track pattern of the same drawing 5, After a publicly known reproducing mechanism (mechanism which contains a rotary head here) is reproduced, it amplifies and restores to the record digital signal by the signal regeneration circuit 52, and the address information (ID) is detected by the ID detection circuit 53. Based on detected ID, the ID detection circuit 53 The reproduction digital signal from the data area 37 and the error correcting code field 38 of drawing 3, Or the reproduction digital signal from the data area 45 and the error correcting code field 46 of drawing 4 is supplied to the error correction circuit 54, and the reproduction digital signal from the data area 41 of drawing 4 is supplied to the error correction circuit 55.
[0050]While the reproduction digital signal by which the error correction was carried out in the error correction circuit 54 is supplied to the control circuit 56, it is supplied to the data distribution circuit 57. The reproduction digital signal supplied to the error correction circuit 55

is supplied to the buffer memory 58 for back AUX by which the error correction was carried out.
[0051]The control circuit 56 analyzes the header of a reproduction digital signal, and generates the control signal of the data distribution circuit 57, and. The writing control signals WTP1-WTP6, and WN and WA of the buffer memory 59-1 to 59-6, the buffer memory 60 for normal, and the buffer memory 58 for AUX are generated, And 4 bytes of additional information (ADISHONARU header) in a reproduction digital signal are analyzed, and with reference to the data arrival time, the reading control signals RTP1-RTP6, and RN and RA are generated so that data may be read to the same timing.
[0052]Based on the above-mentioned control signal, when an input reproduction digital signal is the data TP1-TP6 for special reproduction, the data distribution circuit 57 is distributed to the buffer memory 59-1 to 59-6 for exclusive use, respectively, is supplied, and it is supplied to the buffer memory 60 for normal at the time of the data for ordinary reproduction. About the data TP2-TP6 for special reproduction, only one side of two or more data blocks of two data for special reproduction recorded by overlapping is chosen and outputted. Therefore, even if a head scanning locus shifts a little, the data for special reproduction is suitably renewable.
[0053]The data for special reproduction stored in the buffer memory 59-1 to 59-6 provided in each of the data TP1-TP6 for special reproduction for exclusive use, and the data for ordinary reproduction stored in the buffer memory 60 only for [for ordinary reproduction] data, It is read based on the reading control signals RTP1-RTP6, and RN from the control circuit 56, and is inputted into the selection circuitry 61. The selection circuitry 61 chooses the data of the kind of 1 specified by the control circuit 56, and outputs it as regenerative data. On the other hand, at the time of auxiliary signal reproduction, reading control signal RA is supplied to the buffer memory 58 for AUX from the control circuit 56, and, thereby, a reproduction auxiliary signal is outputted from the buffer memory 58.
[0054]In this invention, it records on the part within the limits which is common in the data for special reproduction to all the methods at least three or more, for example although it explained that a digital signal was recorded and reproduced in one format of the formats of two methods instead of what is limited to above-mentioned working example.
Therefore, this invention is applicable.

[0055]In above-mentioned working example, although the method detector circuit 4 has detected the 1st method or 2nd method, detection of a method is also detectable not only with automatic detection but hand control. Although the data for special reproduction explained that it generated from the data for ordinary reproduction, it can generate separately and it can also be inputted.
[0056]
[Effect of the Invention]Since recording area of the digital signal for special reproduction can be made the same also at the time of record [which / of the 1st and the 2nd format] according to the digital signal record method and recorder of this invention given in Claims 1 and 3 as explained above, It is at each format record time, the circuit which carries out record arrangement of the digital signal for special reproduction on a track can be communalized, and it

is effective in simplification of circuitry.
[0057]Since the digital signal for special reproduction can make the same data volume of the digital signal for special reproduction for which it is an identical configuration in any [at the time of record by the 1st and 2nd formats] case, and it is needed according to this invention, The common use of the circuit for generating the digital signal for special reproduction can be carried out, and it is effective in simplification of circuitry.
[0058]According to the digital signal record method and recorder of this invention given in Claims 2 and 4. Choosing either the digital signal for special reproduction, or the digital signal for ordinary reproduction as the digital signal recording area for special reproduction, and having made it record on it according to the data rate of the digital signal for ordinary reproduction A sake, The change of the circuits (addressing etc.) for arranging the digital signal for special reproduction can be performed unnecessarily, and the burden of a circuit can be reduced substantially.
[0059]Since according to the recording medium of this invention according to claim 5 it replaces with the digital signal for ordinary reproduction in the specific area in the digital signal record section which is common in the format of the 1st and the 2nd of each track appointed beforehand and arrangement record of the digital signal for special reproduction is carried out, In playback equipment, the digital signal for special reproduction is renewable from the field same at the time of every format reproduction.

TECHNICAL FIELD

[Industrial Application]This invention relates to the method of starting a digital signal record method, a recorder, and a recording medium, especially recording the digital signal for ordinary reproduction and the digital signal for special reproduction of two or more kinds of methods on a tape shaped recording medium by a rotary head, and its recorder and recording medium.
[0002]

PRIOR ART

[Description of the Prior Art]When recording a digital signal on tape shaped recording media, such as magnetic tape, by a rotary head and playing this generally, a digital signal is recorded per data block and it plays. At the time of the trick play reproduction (special reproduction) which reproduces a digital signal at a different speed from the time of record on the other hand. Since the scanning locus of the rotary head on a tape shaped recording medium differs from the time of ordinary reproduction, if the discontinuous record data for ordinary reproduction for every time interval of a certain will be reproduced and it remains as it is, it is difficult to acquire a trick play regenerative signal.
[0003]Therefore, by replacing the digital signal for special reproduction with the digital signal for ordinary reproduction, and carrying out arrangement record on the scanning locus of the rotary head at the time of special reproduction, all over the track with which the digital signal for

ordinary reproduction was recorded conventionally, The digital signal record method which made special reproduction possible is known (for example, JP,H6-261278,A: Title of invention "signal recording and reproducing device").
[0004]

EFFECT OF THE INVENTION

[Effect of the Invention]Since recording area of the digital signal for special reproduction can be made the same also at the time of record [which / of the 1st and the 2nd format] according to the digital signal record method and recorder of this invention given in Claims 1 and 3 as explained above, It is at each format record time, the circuit which carries out record arrangement of the digital signal for special reproduction on a track can be communalized, and it is effective in simplification of circuitry.
[0057]Since the digital signal for special reproduction can make the same data volume of the digital signal for special reproduction for which it is an identical configuration in any [at the time of record by the 1st and 2nd formats] case, and it is needed according to this invention, The common use of the circuit for generating the digital signal for special reproduction can be carried out, and it is effective in simplification of circuitry.
[0058]According to the digital signal record method and recorder of this invention given in Claims 2 and 4. Choosing either the digital signal for special reproduction, or the digital signal for ordinary reproduction as the digital signal recording area for special reproduction, and having made it record on it according to the data rate of the digital signal for ordinary reproduction A sake, The change of the circuits (addressing etc.) for arranging the digital signal for special reproduction can be performed unnecessarily, and the burden of a circuit can be reduced substantially.
[0059]Since according to the recording medium of this invention according to claim 5 it replaces with the digital signal for ordinary reproduction in the specific area in the digital signal record section which is common in the format of the 1st and the 2nd of each track appointed beforehand and arrangement record of the digital signal for special reproduction is carried out, In playback equipment, the digital signal for special reproduction is renewable from the field same at the time of every format reproduction.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, in the above-mentioned conventional digital signal record method. Since the recording format of the digital signal recorded on each track of a tape shaped recording medium is constant, For example, record of the digital signal of a desired method cannot be performed with one device in various formats, such as a format which established mutual independently two or more data areas in which record reproduction is possible in one track.
[0005]When it is intermingled and the digital signal for ordinary reproduction and the digital signal for special reproduction are recorded on a recording medium, Since the recording formats

of a digital signal differ, if the data volume of the digital signal for special reproduction differs from the locating position of the digital signal for special reproduction, The circuit for recording the composition and the digital signal for special reproduction of a generating circuit of the digital signal for special reproduction on the specific position of a tape shaped recording medium will be complicated.

[0006]This invention was made in view of the above-mentioned point, and an object of this invention is to provide the recording medium recorded by that cause as the digital signal record method and recorder which can record the digital signal intermingled in the digital signal for ordinary reproduction, and the digital signal for special reproduction in a mutually different format.

[0007]When other purposes of this invention are intermingled and record the digital signal for ordinary reproduction, and the digital signal for special reproduction on a recording medium, Even if the methods of record track format differ, it is in providing the recording medium recorded by that cause as the digital signal record method and recorder which can simplify the generating circuit and record circuit of the digital signal for special reproduction.

[0008]

MEANS

[Means for Solving the Problem]In order to attain the above-mentioned purpose, the digital signal recorder according to claim 1, An input means which inputs the 1st and 2nd digital information signals, and a signal processing means which processes said 1st and 2nd digital information signals to a synthetic information signal, A channel coding means to give a channel coding step about said synthetic information signal, and to acquire a channel coding synthetic information signal, It has a recording device which writes said channel coding synthetic information signal in the 1st track portion in inclined tracks on a recording medium with said recording rate of said recording medium, With reproduction speed equal to said recording rate at playback equipment, said 1st digital information signal is the refreshable information for ordinary reproduction, and said 2nd digital information signal, A data block of said channel coding synthetic information signal which is the refreshable information for special reproduction at a special reproduction speed equal to n1 time (n1 is an integer and is not 0 and 1) of said recording rate at said playback equipment, and accomplishes a data block of said 1st digital information signal, In a digital signal recorder which can carry out generation record of the data block of said channel coding synthetic information signal which accomplishes a data block of said 2nd digital information signal selectively at said 1st track portion, The 1st recording mode that records said channel coding synthetic information signal on said 1st track portion of said track, It faces recording the 3rd channel coding digital information signal and digital auxiliary signal on the 2nd track portion and the 3rd track portion which are within the limits of said 1st track portion of said track, Record said 3rd channel coding digital information signal on the 2nd track portion of said track, and. Have the 2nd recording mode that records said digital auxiliary signal on the 3rd track portion of said track, and in said 2nd recording mode to said input means.

The 3rd digital information signal and said auxiliary signal are inputted, said channel coding means carries out channel coding of the 3rd digital information signal to said 3rd channel coding digital information signal, and said recording device is said recording rate of said recording medium, Record the 3rd [said] channel coding digital information signal and said auxiliary signal on the said 2nd and 3rd track portions, respectively, and said channel coding synthetic information signal, A data block of said channel coding synthetic information signal which accomplishes a data block of said 2nd digital information signal is recorded on said 2nd track portion, Generation record was made to be carried out at said 1st track portion so that it might not be recorded on said 3rd track portion.

[0009]In the digital signal recorder according to claim 2. It dissociates about an edit gap and said 2nd [the] of said track and the 3rd track portion are characterized by a done thing by which parenchyma etc. spread the length of the sum total of the said 2nd and 3rd track portions and said edit gap on the length of said 1st track portion.

[0010]In the digital signal recorder according to claim 3. Said head of the 3rd track portion which said 3rd track portion is located before said 2nd track portion on a track, and is obtained at the time of said 2nd recording mode, In a head of said 1st track portion and a longitudinal direction of a track which are obtained at the time of said 1st recording mode, it was considered as a substantial identity position.

[0011]The digital signal recorder according to claim 4 made said n1 which value of 4, 12, or 24.

[0012]The digital signal recorder according to claim 5 was further provided with a means to acquire said 2nd digital information signal from said 1st digital information signal.

[0013]The recording medium according to claim 6 is characterized by being the recording medium obtained by the above digital signal recorders.

[0014]In the digital signal record method according to claim 7. An input step which inputs the 1st and 2nd digital information signals, and a signal-processing step which processes said 1st and 2nd digital information signals to a synthetic information signal, A channel coding step which performs channel coding to said synthetic information signal in order to acquire a channel coding synthetic information signal, It has a record step which writes said channel coding synthetic information signal in the 1st track portion in inclined tracks on a recording medium with said recording rate of said recording medium, With reproduction speed equal to said recording rate at playback equipment, said 1st digital information signal is the refreshable information for ordinary reproduction, and said 2nd digital information signal, It is the refreshable information for special reproduction at a special reproduction speed equal to n1 time (n1 is an integer and is not 0 and 1) of said recording rate at said playback equipment, A data block of said channel coding synthetic information signal which accomplishes a data block of said 1st digital information signal, In a digital signal record method which can carry out generation record of the data block of said channel coding synthetic information signal which accomplishes a data block of said 2nd digital information signal selectively at said 1st track portion. The 1st recording mode that records said channel coding synthetic information signal on said 1st track portion of said track, It faces recording the 3rd channel coding digital information signal and digital

auxiliary signal on the 2nd track portion and the 3rd track portion which are within the limits of said 1st track portion of said track, Record said 3rd channel coding digital information signal on the 2nd track portion of said track, and. Have the 2nd recording mode that records said digital auxiliary signal on the 3rd track portion of said track, and in said 2nd recording mode in said input step. They are inputted by the 3rd digital information signal and said auxiliary signal, and in said channel coding step. Channel coding is carried out to said 3rd channel coding digital information signal by the 3rd digital information signal, and in said record step. With said recording rate of said recording medium, they are recorded on the said 2nd and 3rd track portions by the 3rd [said] channel coding digital information signal and said auxiliary signal, respectively, and said channel coding synthetic information signal, Generation record is carried out at said 1st track portion so that a data block of said channel coding synthetic information signal which accomplishes a data block of said 2nd digital information signal may be recorded on said 2nd track portion and may not be recorded on said 3rd track portion.
[0015]

EXAMPLE

[Example]Next, working example of this invention is described with reference to Drawings. Drawing 1 shows the block diagram of the recorder for describing the digital signal record method and one working example of a recorder which become this invention. The digital signal for ordinary reproduction of the 1st method recorded on the input terminal 1 by the 1st track format in the figure. (It is also hereafter called the data for ordinary reproduction) is inputted, and the data for ordinary reproduction of the 2nd method recorded by the 2nd track format is inputted into the input terminal 2a, The ancillary data (AUX) by which record reproduction is independently carried out to the data for ordinary reproduction of the 2nd method during the 2nd track format is inputted into input terminal 2b. There are an audio signal and others as this ancillary data.
[0016]Here the digital signal in this example, By two rotary heads which countered the solid of revolution 180 degrees and were provided and from which an azimuth angle differs mutually. It shall be recorded on the track formed by the helical scan magnetic recorder and reproducing device (VTR) of composition of carrying out record reproduction to the magnetic tape it is aslant wound in the angle range of about 180 degrees covering the peripheral side face of a solid of revolution, and runs with constant speed. Each track is constituted by arranging two or more a constant rate of data areas called the sink block equivalent to the above mentioned data block according to the scan of a rotary head.
[0017]Drawing 2 shows the format of an example of this sink block. As shown in the figure, the sink block which is a data block The field 21 of 2 bytes of synchronized signal (Sync) for reproduction of the sink block, The field 22 of 3 bytes of address information (ID), and 3 bytes of header storing region 23 which stores various information, 96 bytes of data storing region 24 and the field 25 of 8 bytes of parity for the error correction of the information on this sink block are 112 bytes of composition in all that were compounded serially. In this example. For example,

it records on the above-mentioned data storing region 24 by using the digital signal in the transport packet (TP) transmission system of MPEG 2 (Moving Picture Experts Group 2), etc. as the data for ordinary reproduction, or the data for special reproduction.

[0018]Two or more these sink blocks are compounded serially, and one track is formed. At the time of digital signal record of said 1st method, this track format is formed by the 1st track format shown in drawing 3, and is formed by the 2nd track format shown in drawing 4 at the time of the digital signal of said 2nd method, and auxiliary signal record.

[0019]The 1st track format shown in drawing 3, It consists of the margin region 31, the preamble field 32, the sub-code field 33, the postamble field 34, the IBG field 35, the preamble field 36, the data area 37, the error correcting code field 38, the postamble field 39, and the margin region 40. Here, the data area 37 is a field where digital signal (data for ordinary reproduction or data for special reproduction) DATA1 [306-sink block] of the 1st method is recorded among the data area 37 which constitutes main data areas, and the error correcting code field 32. The error correcting code field 38 is a field where numerals (C3 numerals) are recorded in the outside for an error correction, and consists of 30 sink blocks.

[0020]On the other hand, the 2nd track format shown in drawing 4 is the track format the digital signal of the 2nd method, and for auxiliary signals, and has given identical codes to drawing 3 and an identical configuration portion. The 2nd track format shown in this drawing 4, The margin region 31, the preamble field 32, the sub-code field 33, the postamble field 34, the IBG field 35, the preamble field 36, the 1st data area 41, the postamble field 42, the IBG field 43, the preamble field 44, the 2nd data area 45, It consists of the error correcting code field 46, the postamble field 39, and the margin region 40.

[0021]Here, the 1st data area 41, postamble field 42, IBG field 43, preamble field 44, and 2nd data area 45 comprise 306 same sink blocks as the data area 37 of drawing 3. Before long, the 1st data area 41 is a field where said auxiliary signal AUX is recorded, and consists of 23 sink blocks. The postamble field 42, the IBG field 43, and the preamble field 44 are two sink blocks, three sink blocks, and one sink block, respectively, and constitute the gap area for edit of six sink blocks as a whole.

[0022]The 2nd data area 45 is a field where digital signal (data for ordinary reproduction or data for special reproduction) DATA2 [277-sink block] of the 2nd method is recorded. The error correcting code field 46 is a field where numerals (C3 numerals) are recorded in the outside for the error correction of digital signal DATA2 of the 2nd method, The error correcting code of 30 sink blocks generated from DATA2 of 277 sink blocks and the data of a total of 306 sink blocks which used 29 sink blocks as zero data is recorded.

[0023]Again, it returns and explains to drawing 1. When the data for ordinary reproduction of the 1st method is inputted into the input terminal 1, this data for input ordinary reproduction is written in the input buffer memory 3, and that data volume (data rate) is calculated by a method being detected in the method detector circuit 4, and the data volume calculation circuit 5 being supplied. On the other hand, when the 2nd data for ordinary reproduction and auxiliary signal of a method are supplied to the input terminal 2a and 2b, respectively, The data for ordinary

reproduction and the auxiliary signal of these 2nd methods are supplied and written in the input buffer memory 3, respectively, The data volume (data rate) is calculated by the method detector circuit 4 being supplied, and a method being detected, and also the data for ordinary reproduction of the 2nd method being supplied to the data volume calculation circuit 5.

[0024]According to the method detected by the method detector circuit 4, the control circuit 6 generates and outputs various kinds of signals, such as a reading control signal of the buffer memory 8, a selection signal of the selection circuitry 9, header information, a synchronized signal, and address information. The data volume detector circuit 5 calculates the data rate of the inputted data for ordinary reproduction, It detects where [of the data rate range which set up data volume (data rate) as compared with some reference values defined beforehand] it enters, the selection signal according to the detection data rate is generated, and it outputs to the below-mentioned selection circuitry 9.

[0025]After the data for the ordinary reproduction of the 1st method or the 2nd method is stored in the input buffer memory 3, it is read by the reading control signal from the control circuit 6, and is supplied to the trick play data generating circuit 7.

On the other hand, the selection circuitry 9 is supplied.

When the auxiliary signal is stored in the input buffer memory 3, the header additional circuit 10 is supplied. The trick play data generating circuit 7 generates six kinds of data for trick plays (for special reproduction) later mentioned based on input ordinary reproduction data, 4 bytes of additional information (for example, the arrival time of a packet and other information) are used as an ADISHONARU header, multiplex is carried out to these, these six kinds of data are outputted in parallel, and it writes in the buffer memory 8 (TP1 B-TP 6B) for exclusive use, respectively. The kind with the same above-mentioned data for special reproduction of thing is an identical configuration in both [at the time of digital signal record of the 1st and 2nd methods] cases.

[0026]Each stored data of the six above-mentioned buffer memories 8 (TP1 B-TP 6B) is read based on the reading control signal from the control circuit 6, and is inputted into the selection circuitry 9. The selection circuitry 9 chooses the above-mentioned data for ordinary reproduction, and the data of one of six kinds of data TP1-TP6 for special reproduction based on both the switching signal from the control circuit 6, and the selection signal from the data volume calculation circuit 5, and supplies them to the header additional circuit 10.

[0027]Namely, in the specific turn defined beforehand, the selection circuitry 9 chooses the data of one of the data for ordinary reproduction, and six kinds of data TP1-TP6 for special reproduction, and outputs it one by one, And at the time of the output of the digital signal for the special reproduction of one kind of six kinds of inside, either the data for special reproduction or the data for ordinary reproduction is chosen and outputted according to the data rate of the ordinary reproduction data detected by the data volume calculation circuit 5. It replaces with the low-priority data for special reproduction, for example among TP1-TP6, and the data for ordinary reproduction is chosen as the data rate of the data for ordinary reproduction becomes high at this time.

[0028]The selection circuitry 9 at the time of the selected output of the data TP2-TP6 for special reproduction. Without being overlapped, it overlaps and two or more data blocks of the data for special reproduction recorded by overlapping choose a part so that it may be arranged before and behind two or more data blocks of the data for special reproduction recorded only once, so that it may mention later.
[0029]The time series complex data which consists of the data for ordinary reproduction outputted from the selection circuitry 9, the data TP1-TP6 for special reproduction, or these parts is supplied to the header additional circuit 10, and 3 bytes of header information from the control circuit 6 are added to the head. . This header information is the header information shown in drawing 2 by 23, and arrangement record of six kinds of data TP1-TP6 for special reproduction was carried out in this example in the specific area which the tape shaped recording medium 18 appointed beforehand. For example, the map information which shows that it is a **** track pattern shown in drawing 5, The information for making it identify which [of the data TP1-TP6 for special reproduction and the data for ordinary reproduction] to be chosen and recorded on six kinds of data TP1 for special reproduction - TP6 recording area is included at least.
[0030]99 bytes of digital signal which consists of the header and the data for ordinary reproduction, or the data for special reproduction taken out from this header additional circuit 10, A part for the sink block which is supplied to the outside code generating circuits 11, and is recorded on the data area of one track here (by the 1st method, by 306 sink blocks of the data area 37 of drawing 3) The 2nd method shows numerals outside 30 sink blocks as an error correcting code when inputted by 277 sink blocks of the data area 45 of drawing 4.
[0031]However, the outside code generating circuits 11 in the 2nd method. To the input digital signal for 277 sink blocks. The outside numerals which receive the data for a total of 306 sink blocks which added zero data for 29 sink blocks equivalent to 29 sink blocks which consist of the 1st data area 41, postamble field 42, IBG field 43, and preamble field 44 of drawing 4 are generated. Outside [this] numerals are recorded on the error correcting code field 38 of drawing 3 at the time of digital signal record of the 1st method, and are recorded on the error correcting code field 46 of drawing 4 at the time of digital signal record of the 2nd method.
[0032]Thus, the digital signal which consists of the outside numerals, the data, and the header which were generated by the outside code generating circuits 11 is supplied to the inner code generating circuit 13, and 8 bytes of parity is generated as an inner code per 99 bytes. The header and auxiliary signal which were taken out from the header additional circuit 10, After being inputted into the outside code generating circuits 12 and generating numerals outside five sink blocks every 18 sink blocks, the ancillary data of these 23 sink block is supplied to the inner code generating circuit 14, and 8 bytes of parity is generated as an inner code per 99 bytes.
[0033]The digital signal (data, a header, outside numerals, and inner code) containing the inner code generated in the inner code generating circuits 13 and 14, respectively, After 3 bytes of address information etc. which were shown by 2 bytes of synchronized signal which the additional circuit 15 was supplied, respectively and was shown in drawing 2 by Sync, or ID are added and being generated by the sink block, the selection circuitry 16 is supplied by a sync

block unit. When the data for ordinary reproduction of the 1st method is inputted into the input terminal 1 based on the output selection signal of the control circuit 6, the selection circuitry 16, The sink block containing the 1st ordinary reproduction data or data for special reproduction of a method inputted respectively through the inner code generating circuit 13 and the additional circuit 15 is chosen, When the 2nd data for ordinary reproduction and auxiliary signal of a method are inputted into the input terminal 2a and 2b, respectively, The sink block containing the data for ordinary reproduction of the 2nd method inputted respectively through the inner code generating circuit 13, or 14 and the additional circuit 15, the data for special reproduction, or ancillary data is chosen.

[0034]The preamble recorded on the fields 32, 33, 34, 39, 42, and 44 etc. which showed the output signal of the selection circuitry 16 to drawing 3 and drawing 4 in the signal recording circuit 17, After multiplex [of a sub-code, the postamble, etc.] is carried out and also being become irregular and amplified, it is recorded on the recording medium (here magnetic tape) 18 by the charting machine using the publicly known rotary head which is not illustrated. This forms a track pattern as shown in drawing 5, and the data for ordinary reproduction and the data TP1-TP6 for special reproduction are recorded. It replaces with some or all of the data TP1-TP6 for special reproduction according to the data rate of the data for ordinary reproduction, and the data for ordinary reproduction is recorded.

[0035]At the time of digital signal record of the 2nd method, only one side of the auxiliary signal inputted into input terminal 2b as the data for ordinary reproduction of the 2nd method and the data for special reproduction which were inputted into the input terminal 2a is recordable independently.

[0036]Next, the track pattern of one working example of the recording medium of this invention is explained with drawing 5. Drawing 5 shows 24 pair track (48 tracks) recorded by the 1st rotary head of + azimuth angle, and the 2nd rotary head of - azimuth angle, Each of each track shows 336 sink blocks which consist of the data area 37 shown in drawing 3, and the error correcting code field 38, or 336 sink blocks from the 1st data area 41 shown in drawing 4 to the error correcting code field 46.

[0037]Arrangement record of the data TP1-TP6 for special reproduction is carried out at the specific position defined beforehand so that drawing 5 may show, but. The record range is set as the 2nd data area 45 of 277 sink blocks except the gap for edit of six sink blocks which consist of the 1st 23 sink blocks and fields 42-44 of the data area 41 of drawing 4, and the error correcting code field 46 of 30 sink blocks. Therefore, the data TP1-TP6 for special reproduction is recorded on a part of 277 sink blocks within the limits also excluding [the time of digital signal record of the 1st method] 29 top sink blocks among the data areas 37 of 306 sink blocks of drawing 3.

[0038]In this working example. A 4X forward direction. Data TPof ** 1st 1 for special reproduction of (4x), a 12X forward direction. Data TPof ** 2nd 2 for special reproduction of (12x), data TPof ** 3rd of 24X (24x) forward direction 3 for special reproduction, 4th data TP4 [of a 4X (-4x) opposite direction] for special reproduction, and data TPof ** 5th of 12X (-12x) opposite direction 5 for special reproduction. And the 6th [of a 24X (-24x) opposite direction]

data TP6 for special reproduction is recorded on the specific position defined beforehand.
[0039]45 sink blocks and the 2nd data TP2 for special reproduction the 1st data TP1 for special reproduction 46 sink blocks, 14 sink blocks and 4th data TP4 for special reproduction are constituted data TPof ** 3rd 3 for special reproduction, and 23 sink block and data TPof ** 6th 6 for special reproduction comprises 13 sink blocks 58 sink block and data TPof ** 5th 5 for special reproduction. The block length of these data for special reproduction is set as the length which a rotary head can reproduce even if some track gap arises at the time of a trick play.
[0040]In drawing 5, the portion by which arrangement record of the data TP1-TP6 for special reproduction is not carried out shows the track portion on which the data for ordinary reproduction is recorded. The portion shown with the white ground of [TP2-TP6] the data TP1-TP6 for special reproduction shows the sink block recorded by overlapping twice.
[0041]When the number of sink blocks of each of above-mentioned data for special reproduction in the track pattern of drawing 5 explained above, a recording data rate, a reproduction data rate, etc. are summarized, it comes to be shown in the following table. However, SB is the abbreviation for a sink block among following front, and 1SB is calculated as average value here as what is 94 bytes.
[0042]
[Table 1]

倍速比	ﾊﾟｰｽﾄ/ｽｷｬﾝ	SB(a)/ｽｷｬﾝ	SB(b)/ｽｷｬﾝ	記録SB/TPF	再生SB/ｽｷｬﾝ	記録ﾃﾞｰﾀﾚｰﾄ(kbps)	再生ﾃﾞｰﾀﾚｰﾄ(kbps)
+4	2	45	0	90	90	507.6	2.03
+12	3	14	16	138	90	259.44	2.03
+24	9	6	4	126	90	118.44	2.03
−4	2	32	13	116	90	654.24	2.03
−12	5	13	5	115	90	216.2	2.03
−24	9	7	3	117	90	109.98	2.03

The number of sink blocks which it overlaps in the data block for special reproduction, and does not record SB (a), the number of sink blocks which it overlaps in the data block for special reproduction, and records SB (b), and TPF mean a trick play frame among the above-mentioned table, and a scan means one rotation of solids of revolution, such as a rotating drum. the time of recording altogether, six kinds of data TP1-TP6 for special reproduction like drawing 5, as shown in Table 1 -- all the data for special reproduction -- per second -- since it is recorded at a rate of 2481.25SB, the rate of occupying in total record data volume (60x306 (SB/s)) serves as 13.5%. The data rates which can record the data for ordinary reproduction at this time are 11.9Mbps.
[0043]In this example, it is premised on that the data rate of the data for ordinary reproduction may change, and when the data rate of the data for ordinary reproduction becomes higher than 11.9Mbps, according to it, the record data volume of the data for special reproduction is reduced. There is the method of reducing when reproducing as the method of this reduction from what has

a low priority among the data TP1-TP6 for special reproduction, for example.
[0044]In this case, for example, the 24X data TP3 and TP6 for special reproduction has the lowest priority, Hereafter, if a priority shall become high in the order of data TP4 [of a 4X opposite direction] for special reproduction, and data TPof 4X forward direction 1 for special reproduction, data TPof 12X opposite direction 5 for special reproduction, and data TP2 for the special reproduction of a 12X forward direction, Record of the data for special reproduction is omitted in order of **TP3 and TP6, **TP4, **TP1, **TP5, and **TP2, all records of the data for special reproduction are omitted eventually, and only the data for ordinary reproduction is recorded as the data rate of the data for ordinary reproduction becomes higher than 11.9Mbps.
[0045]If the data for special reproduction in which it is recorded in this case, the rate that the data for special reproduction occupies, and the data rate of the recordable data for ordinary reproduction are shown collectively, it will become as it is shown in the following table.
[0046]
[Table 2]

記録される特殊再生データ	特殊再生データが占める割合（%）	記録可能な通常再生データレート(Mbps)
無し	0	13．8
TP2	1．9	13．5
TP2, TP5	3．4	13．3
TP2, TP5, TP1	7．1	12．8
TP2, TP5, TP1, TP4	11．9	12．2
TP2, TP5, TP1, TP4, TP3, TP6	13．5	11．9

However, the ordinary reproduction data rate in which record reproduction is possible is a data rate of the data for input ordinary reproduction of the 1st method recorded in the 1st format among the above-mentioned table 2.
The data for ordinary reproduction of the 2nd method recorded in the 2nd format becomes less than this about 1.31 Mbps (= (23+6) SB / track x60 track / sx94 Byte/SBx8 bit/Byte).

[0047]Since it is the same in this example in the case of the kind with same data volume required for the data TP1-TP6 for special reproduction of data for special reproduction also when recording which of the digital signal of the 1st method, and the digital signal of the 2nd method, The trick play data generating circuit 7 which generates the data for special reproduction can be shared to digital signal record of the 1st and 2nd methods, and, therefore, a circuit can be simplified.
[0048]Since the record locating position of the data TP1-TP6 for special reproduction is immobilization in this example as shown in drawing 5 also when recording which of the digital signal of the 1st method, and the digital signal of the 2nd method, The burden of the circuit for carrying out arrangement record of the data TP1-TP6 for special reproduction can be managed with a general way on a track.
[0049]Next, the composition and operation of digital signal playback equipment which

reproduce the recording medium of this invention are explained with drawing 6. The recording media 51 are the above-mentioned recording medium 18 and a recording medium which has a track pattern of the same drawing 5, After a publicly known reproducing mechanism (mechanism which contains a rotary head here) is reproduced, it amplifies and restores to the record digital signal by the signal regeneration circuit 52, and the address information (ID) is detected by the ID detection circuit 53. Based on detected ID, the ID detection circuit 53 The reproduction digital signal from the data area 37 and the error correcting code field 38 of drawing 3, Or the reproduction digital signal from the data area 45 and the error correcting code field 46 of drawing 4 is supplied to the error correction circuit 54, and the reproduction digital signal from the data area 41 of drawing 4 is supplied to the error correction circuit 55.

[0050]While the reproduction digital signal by which the error correction was carried out in the error correction circuit 54 is supplied to the control circuit 56, it is supplied to the data distribution circuit 57. The reproduction digital signal supplied to the error correction circuit 55 is supplied to the buffer memory 58 for back AUX by which the error correction was carried out.

[0051]The control circuit 56 analyzes the header of a reproduction digital signal, and generates the control signal of the data distribution circuit 57, and. The writing control signals WTP1-WTP6, and WN and WA of the buffer memory 59-1 to 59-6, the buffer memory 60 for normal, and the buffer memory 58 for AUX are generated, And 4 bytes of additional information (ADISHONARU header) in a reproduction digital signal are analyzed, and with reference to the data arrival time, the reading control signals RTP1-RTP6, and RN and RA are generated so that data may be read to the same timing.

[0052]Based on the above-mentioned control signal, when an input reproduction digital signal is the data TP1-TP6 for special reproduction, the data distribution circuit 57 is distributed to the buffer memory 59-1 to 59-6 for exclusive use, respectively, is supplied, and it is supplied to the buffer memory 60 for normal at the time of the data for ordinary reproduction. About the data TP2-TP6 for special reproduction, only one side of two or more data blocks of two data for special reproduction recorded by overlapping is chosen and outputted. Therefore, even if a head scanning locus shifts a little, the data for special reproduction is suitably renewable.

[0053]The data for special reproduction stored in the buffer memory 59-1 to 59-6 provided in each of the data TP1-TP6 for special reproduction for exclusive use, and the data for ordinary reproduction stored in the buffer memory 60 only for [for ordinary reproduction] data, It is read based on the reading control signals RTP1-RTP6, and RN from the control circuit 56, and is inputted into the selection circuitry 61. The selection circuitry 61 chooses the data of the kind of 1 specified by the control circuit 56, and outputs it as regenerative data. On the other hand, at the time of auxiliary signal reproduction, reading control signal RA is supplied to the buffer memory 58 for AUX from the control circuit 56, and, thereby, a reproduction auxiliary signal is outputted from the buffer memory 58.

[0054]In this invention, it records on the part within the limits which is common in the data for special reproduction to all the methods at least three or more, for example although it explained that a digital signal was recorded and reproduced in one format of the formats of two methods

instead of what is limited to above-mentioned working example.
Therefore, this invention is applicable.

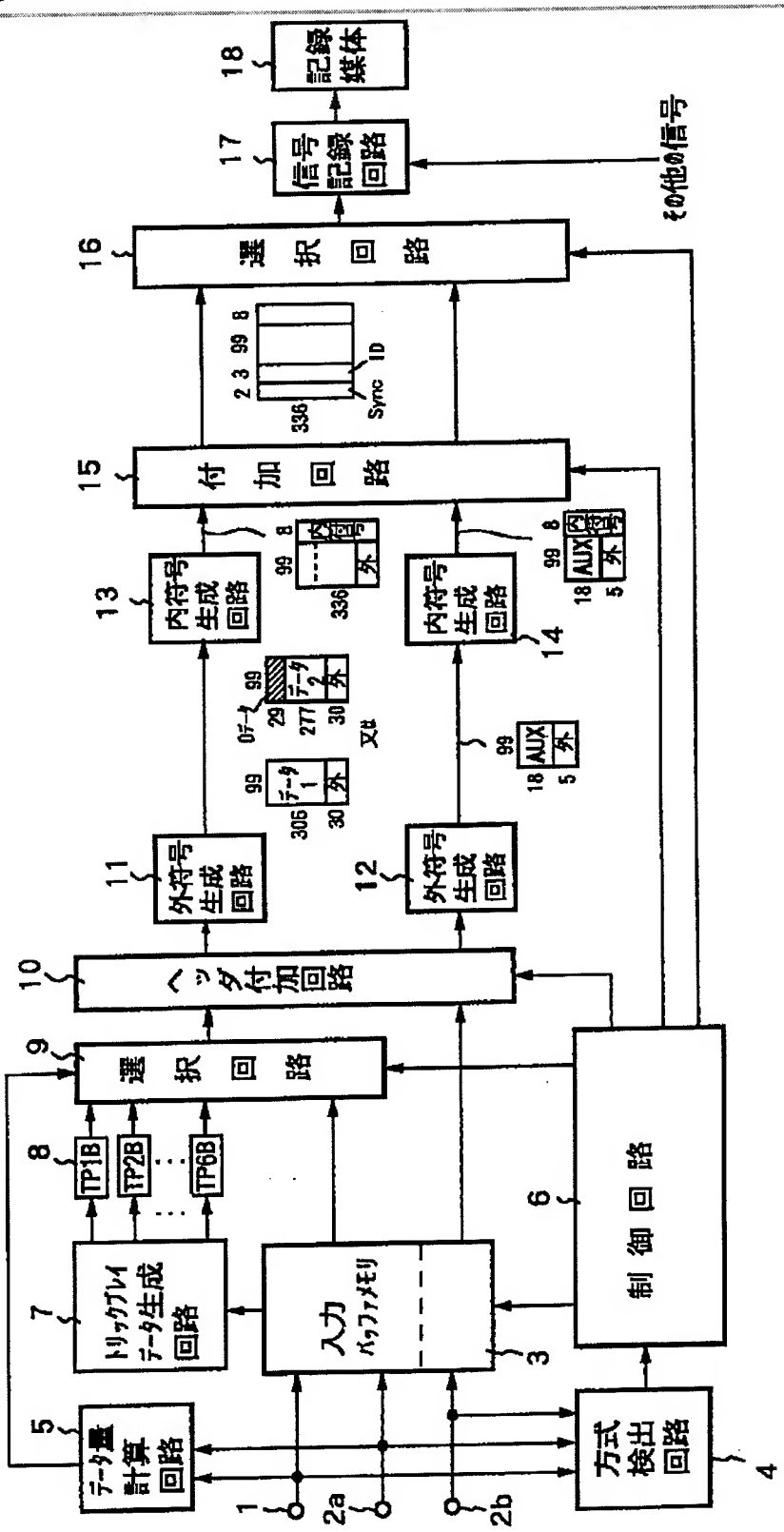
[0055]In above-mentioned working example, although the method detector circuit 4 has detected the 1st method or 2nd method, detection of a method is also detectable not only with automatic detection but hand control. Although the data for special reproduction explained that it generated from the data for ordinary reproduction, it can generate separately and it can also be inputted.
[0056]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a block diagram of the recorder for describing the digital signal record method and one working example of a recorder which become this invention.
[Drawing 2]It is a figure showing the format of an example of the data block recorded by this invention.
[Drawing 3]It is a figure showing an example of the track format of the 1st method formed of this invention.
[Drawing 4]It is a figure showing an example of the track format of the 2nd method formed of this invention.
[Drawing 5]It is a figure showing the track format of one working example of the recording medium which becomes this invention.
[Drawing 6]It is a block diagram of an example of digital signal playback equipment.
[Description of Notations]
1 The data input terminal for ordinary reproduction of the 1st method
2a The data input terminal for ordinary reproduction of the 2nd method
2b The auxiliary signal input terminal by the 2nd method
3 Input buffer memory
4 Method detector circuit
5 Data volume calculation circuit (detection means)
6 Control circuit (the 1st and 2nd selecting means, addition means)
7 Trick play data generating circuit
8 Buffer memory
9 Selection circuitry (the 1st selecting means)
10 Header additional circuit (addition means)
11 and 12 Outside code generating circuits
13 and 14 Inner code generating circuit
15 Additional circuit
16 Selection circuitry (the 2nd selecting means)
17 Signal recording circuit
18 and 51 Recording medium

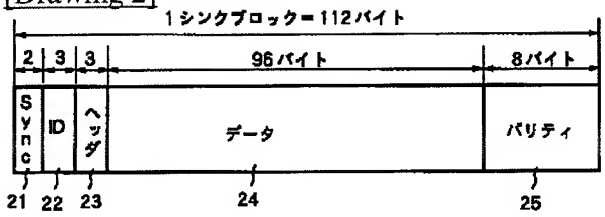
24 Data storing region
37 Data area
38, 46 error-correcting-code field
41 The 1st data area
45 The 2nd data area
TP1-TP6 Data for special reproduction

DRAWINGS

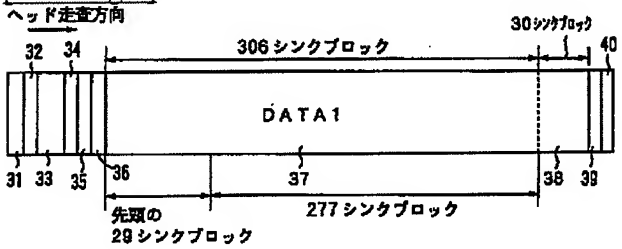


[Drawing 1]

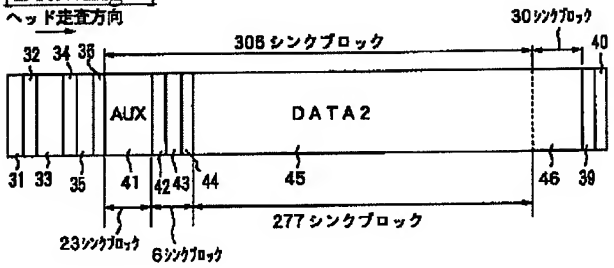
[Drawing 2]



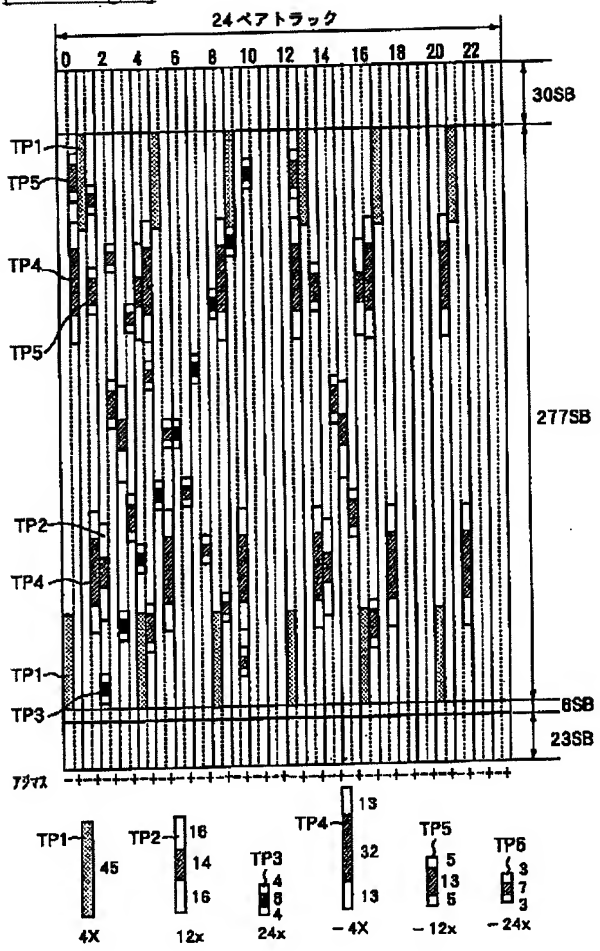
[Drawing 3]

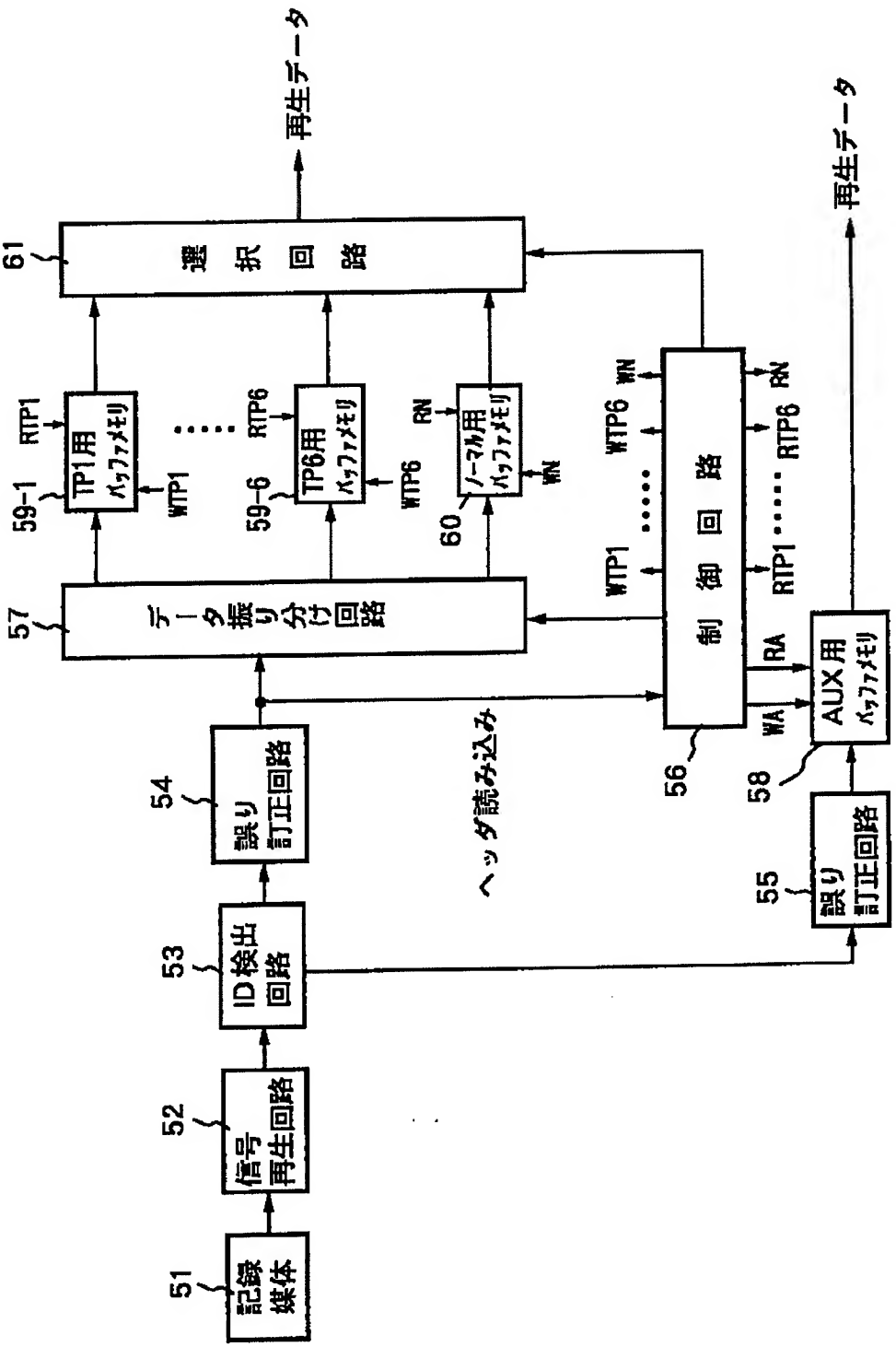


[Drawing 4]



[Drawing 5]


24ペアトラック
0 2 4 6 8 10 12 14 16 18 20 22
30SB
277SB
6SB
23SB
TP1
TP5
TP4
TP5
TP2
TP4
TP1
TP3
TP1 45 4X
TP2 16 14 16 12x
TP3 4 8 4 24x
TP4 13 32 13 −4X
TP5 5 13 5 −12x
TP6 3 7 3 −24x


再生データ
61
選択回路
RTP1
59-1
TP1用バッファメモリ
WTP1
RTP6
59-6
TP6用バッファメモリ
WTP6
RN
60
ノーマル用バッファメモリ
WN
57
データ振り分け回路
WTP1 ..... WTP6 WN
制御回路
RTP1 ..... RTP6 RN
56
RA
WA
58
AUX用バッファメモリ
再生データ
ヘッダ読み込み
54
誤り訂正回路
53
ID検出回路
55
誤り訂正回路
52
信号再生回路
51
記録媒体

[Drawing 6]

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Ｇ１１Ｂ　20/10	３０１	Ｇ１１Ｂ　20/10	３０１Ｚ
20/12	１０３	20/12	１０３
Ｈ０４Ｎ　5/7826		Ｈ０４Ｎ　5/782	Ｄ
5/92		5/92	Ｈ

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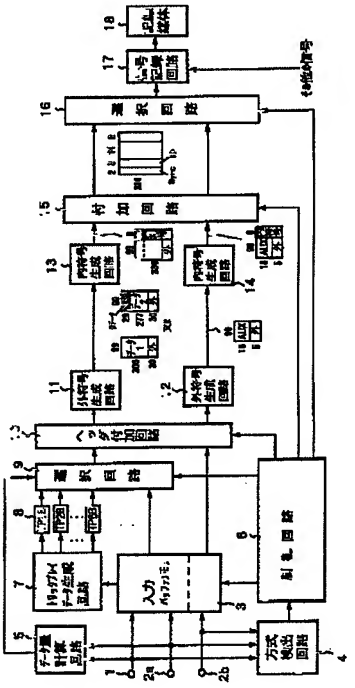
(54)【発明の名称】　ディジタル信号記録方法、記録装置及び記録媒体

(57)【要約】

【課題】　異なる方式の通常再生用ディジタル信号と特殊再生用ディジタル信号とを混在して異なるフォーマットで簡単な回路構成で記録し得るディジタル信号記録方法及び記録装置と記録媒体を提供することを目的とする。

【解決手段】　第１の記録モードにおいて、通常再生用のデータである第１のディジタル情報信号と、特殊再生用データである第２のディジタル情報信号とを混合した合成情報信号をトラックの第１のトラック部分に記録する一方、第２の記録モードにおいて、第３のディジタル情報信号及びＡＵＸ信号を夫々第１のトラックの範囲内にある第２及び第３のトラック部分に記録する。但し、第１の記録モードにおいて、第２のディジタル情報信号は、第２のトラック部分には記録されるものの、第３のトラック部分には記録されない。



【特許請求の範囲】
【請求項1】第１及び第２のディジタル情報信号を入力する入力手段と、
前記第１及び第２のディジタル情報信号を合成情報信号に処理する信号処理手段と、
前記合成情報信号についてチャンネル符号化ステップを施してチャンネル符号化合成情報信号を得るチャンネル符号化手段と、
記録媒体上の傾斜トラックにおける第１のトラック部分に前記記録媒体の前記記録速度で前記チャンネル符号化合成情報信号を書き込む記録手段とを備え、
前記第１のディジタル情報信号は、再生装置にて前記記録速度と等しい再生速度で再生可能な通常再生用情報であり、前記第２のディジタル情報信号は、前記再生装置にて前記記録速度のｎ１倍（ｎ１は整数であり、且つ０及び１ではない）に等しい特殊再生速度で再生可能な特殊再生用情報であり、
前記第１のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックと、前記第２のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックとを選択的に前記第１のトラック部分に生成記録することができるディジタル信号記録装置において、
前記チャンネル符号化合成情報信号を前記トラックの前記第１のトラック部分に記録する第１の記録モードと、第３のチャンネル符号化ディジタル情報信号とディジタル補助信号とを前記トラックの前記第１のトラック部分の範囲内にある第２のトラック部分及び第３のトラック部分に記録するに際し、前記第３のチャンネル符号化ディジタル情報信号を前記トラックの第２のトラック部分に記録すると共に、前記ディジタル補助信号を前記トラックの第３のトラック部分に記録する第２の記録モードとを有し、
前記第２の記録モードにおいて、前記入力手段には、第３のディジタル情報信号及び前記補助信号が入力され、前記チャンネル符号化手段は、第３のディジタル情報信号を前記第３のチャンネル符号化ディジタル情報信号にチャンネル符号化し、前記記録手段は、前記記録媒体の前記記録速度で、前記第３のチャンネル符号化ディジタル情報信号及び前記補助信号を前記第２及び第３のトラック部分に夫々記録し、
前記チャンネル符号化合成情報信号は、前記第２のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックが前記第２のトラック部分に記録され、前記第３のトラック部分に記録されないよう前記第１のトラック部分に生成記録されることを特徴とするディジタル信号記録装置。
【請求項2】前記トラックの前記第２及び第３のトラック部分は、編集ギャップにて分離されており、前記第２及び第３のトラック部分と前記編集ギャップとの合計の長さは、前記第１のトラック部分の長さに実質等しいことを特徴とする請求項１記載のディジタル信号記録装置。
【請求項3】前記第３のトラック部分は、トラック上で前記第２のトラック部分の前に位置しており、前記第２の記録モード時に得られる前記第３のトラック部分の先頭は、前記第１の記録モード時に得られる前記第１のトラック部分の先頭とトラックの長手方向において実質同一位置となることを特徴とする請求項１又は２記載のディジタル信号記録装置。
【請求項4】前記ｎ１が４、１２又は２４の何れかの値であることを特徴とする請求項１乃至３の何れか一項記載のディジタル信号記録装置。
【請求項5】前記第１のディジタル情報信号から前記第２のディジタル情報信号を取得する手段を更に備えることを特徴とする請求項１記載のディジタル信号記録装置。
【請求項6】前記何れかの請求項に記載のディジタル信号記録装置により得られることを特徴とする記録媒体。
【請求項7】第１及び第２のディジタル情報信号を入力する入力ステップと、
前記第１及び第２のディジタル情報信号を合成情報信号に処理する信号処理ステップと、
チャンネル符号化合成情報信号を得るために前記合成情報信号にチャンネル符号化を施すチャンネル符号化ステップと、
記録媒体上の傾斜トラックにおける第１のトラック部分に前記記録媒体の前記記録速度で前記チャンネル符号化合成情報信号を書き込む記録ステップとを有し、
前記第１のディジタル情報信号は、再生装置にて前記記録速度と等しい再生速度で再生可能な通常再生用情報であり、前記第２のディジタル情報信号は、前記再生装置にて前記記録速度のｎ１倍（ｎ１は整数であり、且つ０及び１ではない）に等しい特殊再生速度で再生可能な特殊再生用情報であり、
前記第１のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックと、前記第２のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックとを選択的に前記第１のトラック部分に生成記録することができるディジタル信号記録方法において、
前記チャンネル符号化合成情報信号を前記トラックの前記第１のトラック部分に記録する第１の記録モードと、第３のチャンネル符号化ディジタル情報信号とディジタル補助信号とを前記トラックの前記第１のトラック部分の範囲内にある第２のトラック部分及び第３のトラック部分に記録するに際し、前記第３のチャンネル符号化ディジタル情報信号を前記トラックの第２のトラック部分に記録すると共に、前記ディジタル補助信号を前記トラックの第３のトラック部分に記録する第２の記録モード

とを有し、
前記第２の記録モードにおいて、前記入力ステップでは、第３のディジタル情報信号及び前記補助信号が入力され、前記チャンネル符号化ステップでは、第３のディジタル情報信号が前記第３のチャンネル符号化ディジタル情報信号にチャンネル符号化され、前記記録ステップでは、前記記録媒体の前記記録速度で、前記第３のチャンネル符号化ディジタル情報信号及び前記補助信号が前記第２及び第３のトラック部分に夫々記録され、
前記チャンネル符号化合成情報信号は、前記第２のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックが前記第２のトラック部分に記録され、前記第３のトラック部分に記録されないよう前記第１のトラック部分に生成記録されることを特徴とするディジタル信号記録方法。
【発明の詳細な説明】
【0001】
【産業上の利用分野】本発明はディジタル信号記録方法、記録装置及び記録媒体に係り、特にテープ状記録媒体に回転ヘッドにより複数種類の方式の通常再生用ディジタル信号と特殊再生用ディジタル信号を記録する方法、及びその記録装置と記録媒体に関する。
【0002】
【従来の技術】一般に、磁気テープ等のテープ状記録媒体にディジタル信号を回転ヘッドにより記録し、これを再生する場合、ディジタル信号をデータブロック単位で記録し再生する。一方、記録時とは異なる速度でディジタル信号を再生するトリックプレイ再生（特殊再生）時には、テープ状記録媒体上における回転ヘッドの走査軌跡が通常再生時とは異なるため、ある時間間隔毎の非連続の通常再生用記録データを再生することとなり、そのままではトリックプレイ再生信号を得ることは困難である。
【0003】そのため、従来より通常再生用ディジタル信号が記録されたトラック中に、特殊再生時の回転ヘッドの走査軌跡上に特殊再生用のディジタル信号を通常再生用ディジタル信号に代えて配置記録することにより、特殊再生を可能にしたディジタル信号記録方法が知られている（例えば、特開平６－２６１２７８号公報：発明の名称「信号記録再生装置」）。
【0004】
【発明が解決しようとする課題】しかるに、上記の従来のディジタル信号記録方法では、テープ状記録媒体の各トラックに記録されるディジタル信号の記録フォーマットが一定であるため、例えば１本のトラックに互いに独立して記録再生可能な複数のデータ領域を設けたフォーマットなど種々のフォーマットで所望の方式のディジタル信号の記録が１台の装置でできない。
【0005】また、通常再生用ディジタル信号と特殊再生用ディジタル信号とを混在して記録媒体に記録する場合、ディジタル信号の記録フォーマットが異なるために特殊再生用ディジタル信号のデータ量や特殊再生用ディジタル信号の配置位置が異なると、特殊再生用ディジタル信号の生成回路の構成や特殊再生用ディジタル信号をテープ状記録媒体の特定の位置に記録するための回路が複雑となってしまう。
【0006】本発明は上記の点に鑑みなされたもので、通常再生用ディジタル信号と特殊再生用ディジタル信号とを混在したディジタル信号を互いに異なるフォーマットで記録し得るディジタル信号記録方法及び記録装置と、それにより記録された記録媒体を提供することを目的とする。
【0007】また、本発明の他の目的は、通常再生用ディジタル信号と特殊再生用ディジタル信号とを混在して記録媒体に記録する場合、記録トラックフォーマットの方式が異なっても特殊再生用ディジタル信号の生成回路や記録回路を簡略化し得るディジタル信号記録方法及び記録装置とそれにより記録された記録媒体を提供することにある。
【0008】
【課題を解決するための手段】上記の目的を達成するため、請求項１記載のディジタル信号記録装置は、第１及び第２のディジタル情報信号を入力する入力手段と、前記第１及び第２のディジタル情報信号を合成情報信号に処理する信号処理手段と、前記合成情報信号についてチャンネル符号化ステップを施してチャンネル符号化合成情報信号を得るチャンネル符号化手段と、記録媒体上の傾斜トラックにおける第１のトラック部分に前記記録媒体の前記記録速度で前記チャンネル符号化合成情報信号を書き込む記録手段とを備え、前記第１のディジタル情報信号は、再生装置にて前記記録速度と等しい再生速度で再生可能な通常再生用情報であり、前記第２のディジタル情報信号は、前記再生装置にて前記記録速度のｎ１倍（ｎ１は整数であり、且つ０及び１ではない）に等しい特殊再生速度で再生可能な特殊再生用情報であり、前記第１のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックと、前記第２のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックとを選択的に前記第１のトラック部分に生成記録することができるディジタル信号記録装置において、前記チャンネル符号化合成情報信号を前記トラックの前記第１のトラック部分に記録する第１の記録モードと、第３のチャンネル符号化ディジタル情報信号とディジタル補助信号とを前記トラックの前記第１のトラック部分の範囲内にある第２のトラック部分及び第３のトラック部分に記録するに際し、前記第３のチャンネル符号化ディジタル情報信号を前記トラックの第２のトラック部分に記録すると共に、前記ディジタル補助信号を前記トラックの第３のトラック部分に記録する第２の記録モードとを有し、

前記第２の記録モードにおいて、前記入力手段には、第３のディジタル情報信号及び前記補助信号が入力され、前記チャンネル符号化手段は、第３のディジタル情報信号を前記第３のチャンネル符号化ディジタル情報信号にチャンネル符号化し、前記記録手段は、前記記録媒体の前記記録速度で、前記第３のチャンネル符号化ディジタル情報信号及び前記補助信号を前記第２及び第３のトラック部分に夫々記録し、前記チャンネル符号化合成情報信号は、前記第２のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックが前記第２のトラック部分に記録され、前記第３のトラック部分に記録されないよう前記第１のトラック部分に生成記録されるようにしたことを特徴とするものである。

【0009】また、請求項２記載のディジタル信号記録装置では、前記トラックの前記第２及び第３のトラック部分は、編集ギャップにて分離されており、前記第２及び第３のトラック部分と前記編集ギャップとの合計の長さを、前記第１のトラック部分の長さに実質等しくさせたことを特徴とするものである。

【0010】また、請求項３記載のディジタル信号記録装置では、前記第３のトラック部分は、トラック上で前記第２のトラック部分の前に位置しており、前記第２の記録モード時に得られる前記第３のトラック部分の先頭は、前記第１の記録モード時に得られる前記第１のトラック部分の先頭とトラックの長手方向において実質同一位置としたことを特徴とするものである。

【0011】また、請求項４記載のディジタル信号記録装置は、前記ｎ１を４、１２又は２４の何れかの値としたことを特徴とするものである。

【0012】また、請求項５記載のディジタル信号記録装置は、前記第１のディジタル情報信号から前記第２のディジタル情報信号を取得する手段を更に備えたことを特徴とするものである。

【0013】また、請求項６記載の記録媒体は、以上のようなディジタル信号記録装置により得られた記録媒体であることを特徴とするものである。

【0014】また、請求項７記載のディジタル信号記録方法では、第１及び第２のディジタル情報信号を入力する入力ステップと、前記第１及び第２のディジタル情報信号を合成情報信号に処理する信号処理ステップと、チャンネル符号化合成情報信号を得るために前記合成情報信号にチャンネル符号化を施すチャンネル符号化ステップと、記録媒体上の傾斜トラックにおける第１のトラック部分に前記記録媒体の前記記録速度で前記チャンネル符号化合成情報信号を書き込む記録ステップとを有し、前記第１のディジタル情報信号は、再生装置にて前記記録速度と等しい再生速度で再生可能な通常再生用情報であり、前記第２のディジタル情報信号は、前記再生装置にて前記記録速度のｎ１倍（ｎ１は整数であり、且つ０及び１ではない）に等しい特殊再生速度で再生可能な特殊再生用情報であり、前記第１のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックと、前記第２のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックとを選択的に前記第１のトラック部分に生成記録することができるディジタル信号記録方法において、前記チャンネル符号化合成情報信号を前記トラックの前記第１のトラック部分に記録する第１の記録モードと、第３のチャンネル符号化ディジタル情報信号とディジタル補助信号とを前記トラックの前記第１のトラック部分の範囲内にある第２のトラック部分及び第３のトラック部分に記録するに際し、前記第３のチャンネル符号化ディジタル情報信号を前記トラックの第２のトラック部分に記録すると共に、前記ディジタル補助信号を前記トラックの第３のトラック部分に記録する第２の記録モードとを有し、前記第２の記録モードにおいて、前記入力ステップでは、第３のディジタル情報信号及び前記補助信号が入力され、前記チャンネル符号化ステップでは、第３のディジタル情報信号が前記第３のチャンネル符号化ディジタル情報信号にチャンネル符号化され、前記記録ステップでは、前記記録媒体の前記記録速度で、前記第３のチャンネル符号化ディジタル情報信号及び前記補助信号が前記第２及び第３のトラック部分に夫々記録され、前記チャンネル符号化合成情報信号は、前記第２のディジタル情報信号のデータブロックを成す前記チャンネル符号化合成情報信号のデータブロックが前記第２のトラック部分に記録され、前記第３のトラック部分に記録されないよう前記第１のトラック部分に生成記録されることを特徴とするものである。

【0015】

【実施例】次に、本発明の実施例について図面を参照して説明する。図１は本発明になるディジタル信号記録方法及び記録装置の一実施例を説明するための記録装置のブロック図を示す。同図において、入力端子１には第１のトラックフォーマットで記録される第１の方式の通常再生用ディジタル信号（以下、通常再生用データともいう）が入力され、入力端子２ａには第２のトラックフォーマットで記録される第２の方式の通常再生用データが入力され、入力端子２ｂには第２のトラックフォーマット中において第２の方式の通常再生用データとは独立して記録再生される補助データ（ＡＵＸ）が入力される。この補助データとしては音声信号その他がある。

【0016】ここで、本実施例におけるディジタル信号は、回転体に１８０度対向して設けられた互いにアジマス角度の異なる２つの回転ヘッドにより、回転体の外周側面に約１８０度の角度範囲にわたって斜めに巻回されて一定速度で走行される磁気テープに記録再生する構成のヘリカルスキャン方式磁気記録再生装置（ＶＴＲ）によって形成されるトラックに記録されるものとする。各トラ

ックは、前記したデータブロックに相当するシンクブロックと呼ばれる一定量のデータエリアを回転ヘッドの走査に従って複数個配置することにより構成される。

【0017】図２はこのシンクブロックの一例のフォーマットを示す。同図に示すように、データブロックであるシンクブロックはそのシンクブロックの再生のための２バイトの同期信号（Ｓｙｎｃ）の領域２１と、３バイトのアドレス情報（ＩＤ）の領域２２と、様々な情報を格納する３バイトのヘッダ格納領域２３と、９６バイトのデータ格納領域２４と、このシンクブロックの情報の誤り訂正のための８バイトのパリティの領域２５とが時系列的に合成された、全部で１１２バイトの構成である。本実施例では、例えばＭＰＥＧ２（Moving Picture Experts Group 2）のトランスポートパケット（ＴＰ）伝送方式におけるディジタル信号などを通常再生用データあるいは特殊再生用データとして上記のデータ格納領域２４に記録するものである。

【0018】また、このシンクブロックが複数個時系列的に合成されて１本のトラックが形成される。このトラックフォーマットは、前記第１の方式のディジタル信号記録時には、図３に示す第１のトラックフォーマットで形成され、前記第２の方式のディジタル信号及び補助信号記録時には図４に示す第２のトラックフォーマットで形成される。

【0019】図３に示す第１のトラックフォーマットは、マージン領域３１、プリアンブル領域３２、サブコード領域３３、ポストアンブル領域３４、ＩＢＧ領域３５、プリアンブル領域３６、データ領域３７、誤り訂正符号領域３８、ポストアンブル領域３９及びマージン領域４０からなる。ここで、主要データエリアを構成しているデータ領域３７及び誤り訂正符号領域３２のうちデータ領域３７は、第１の方式のディジタル信号（通常再生用データあるいは特殊再生用データ）ＤＡＴＡ１が３０６シンクブロック記録される領域である。また、誤り訂正符号領域３８は、誤り訂正のための外符号（Ｃ３符号）が記録される領域で、３０シンクブロックからなる。

【0020】一方、図４に示す第２のトラックフォーマットは、第２の方式のディジタル信号及び補助信号用のトラックフォーマットで、図３と同一構成部分には同一符号を付してある。この図４に示す第２のトラックフォーマットは、マージン領域３１、プリアンブル領域３２、サブコード領域３３、ポストアンブル領域３４、ＩＢＧ領域３５、プリアンブル領域３６、第１のデータ領域４１、ポストアンブル領域４２、ＩＢＧ領域４３、プリアンブル領域４４、第２のデータ領域４５、誤り訂正符号領域４６、ポストアンブル領域３９及びマージン領域４０からなる。

【0021】ここで、第１のデータ領域４１、ポストアンブル領域４２、ＩＢＧ領域４３、プリアンブル領域４４及び第２のデータ領域４５は、図３のデータ領域３７と同一の３０６シンクブロックから構成されている。そのうち、第１のデータ領域４１は、前記補助信号ＡＵＸが記録される領域で、２３シンクブロックからなる。また、ポストアンブル領域４２、ＩＢＧ領域４３及びプリアンブル領域４４は、それぞれ２シンクブロック、３シンクブロック及び１シンクブロックで、全体として６シンクブロックの編集用ギャップ領域を構成している。

【0022】更に、第２のデータ領域４５は第２の方式のディジタル信号（通常再生用データあるいは特殊再生用データ）ＤＡＴＡ２が２７７シンクブロック記録される領域である。また、誤り訂正符号領域４６は、第２の方式のディジタル信号ＤＡＴＡ２の誤り訂正のための外符号（Ｃ３符号）が記録される領域で、２７７シンクブロックのＤＡＴＡ２と、２９シンクブロックを０データとした計３０６シンクブロックのデータから生成された３０シンクブロックの誤り訂正符号が記録される。

【0023】再び、図１に戻って説明する。入力端子１に第１の方式の通常再生用データが入力されたときには、この入力通常再生用データは入力バッファメモリ３に書き込まれると共に、方式検出回路４で方式が検出され、またデータ量計算回路５に供給されてそのデータ量（データレート）が計算される。一方、入力端子２ａ及び２ｂに第２の方式の通常再生用データ及び補助信号がそれぞれ供給されたときには、これら第２の方式の通常再生用データ及び補助信号がそれぞれ入力バッファメモリ３に供給されて書き込まれ、また方式検出回路４に供給されて方式が検出され、更に第２の方式の通常再生用データがデータ量計算回路５に供給されてそのデータ量（データレート）が計算される。

【0024】方式検出回路４により検出された方式に従って、制御回路６はバッファメモリ８の読み出し制御信号、選択回路９の選択信号、ヘッダ情報、同期信号、アドレス情報など各種の信号を生成して出力する。データ量検出回路５は入力された通常再生用データのデータレートを計算し、データ量（データレート）をあらかじめ定めた幾つかの基準値と比較して設定したデータレート範囲のどこに入るかを検出し、その検出データレートに応じた選択信号を発生して後述の選択回路９へ出力する。

【0025】第１の方式又は第２の方式の通常再生用のデータは、入力バッファメモリ３に格納された後、制御回路６よりの読み出し制御信号により読み出されてトリックプレイデータ生成回路７に供給される一方、選択回路９に供給される。また、入力バッファメモリ３に補助信号が格納されているときにはヘッダ付加回路１０に供給される。トリックプレイデータ生成回路７は、入力通常再生データに基づいて後述する６種類のトリックプレイ用（特殊再生用）データを生成し、更にこれらに例えば４バイトの付加情報（例えば、パケットの到着時刻及びその他の情報）をアディショナルヘッダとして多重し、こ

れら６種類のデータを並列に出力して、それぞれ専用のバッファメモリ８（ＴＰ１Ｂ～ＴＰ６Ｂ）に書き込む。上記の特殊再生用データは、同じ種類のものは第１及び第２の方式のディジタル信号記録時のどちらの場合も同一構成である。

【0026】上記の６つのバッファメモリ８（ＴＰ１Ｂ～ＴＰ６Ｂ）の各格納データは、制御回路６よりの読み出し制御信号に基づき読み出されて選択回路９に入力される。選択回路９は、上記の通常再生用データと６種類の特殊再生用データＴＰ１～ＴＰ６のうちの一のデータを、制御回路６よりのスイッチング信号とデータ量計算回路５よりの選択信号の両方に基づいて選択してヘッダ付加回路１０へ供給する。

【0027】すなわち、選択回路９は予め定めた特定の順番で通常再生用データと６種類の特殊再生用データＴＰ１～ＴＰ６のうちの一のデータを選択して順次に出力し、かつ、６種類のうちのいずれかの種類の特殊再生用のディジタル信号の出力時には、データ量計算回路５により検出された通常再生データのデータレートに応じて特殊再生用データ及び通常再生用データの一方を選択して出力する。このとき、通常再生用データのデータレートが高くなるに従って、例えばＴＰ１～ＴＰ６のうち優先順位の低い特殊再生用データに代えて通常再生用データを選択する。

【0028】また、選択回路９は、特殊再生用データＴＰ２～ＴＰ６の選択出力時には、後述するように、重複して記録される特殊再生用データの複数のデータブロックが、重複されることなく１回だけ記録される特殊再生用データの複数のデータブロックの前後に配置されるように、一部を重複して選択する。

【0029】選択回路９から出力された通常再生用データと特殊再生用データＴＰ１～ＴＰ６あるいはこれらの一部からなる時系列合成データは、ヘッダ付加回路１０に供給されて、制御回路６からの３バイトのヘッダ情報がその先頭に付加される。このヘッダ情報は図２に２３で示したヘッダ情報で、本実施例では６種類の特殊再生用データＴＰ１～ＴＰ６がテープ状記録媒体１８の予め定めた特定のエリアに配置記録された、例えば図５に示す如きトラックパターンであることを示すマップ情報と、６種類の特殊再生用データＴＰ１～ＴＰ６記録エリアに、特殊再生用データＴＰ１～ＴＰ６及び通常再生用データのうちのどちらが選択されて記録されているかを識別させるための情報を少なくとも含む。

【0030】このヘッダ付加回路１０より取り出されたヘッダ及び通常再生用データ又は特殊再生用データとからなる９９バイトのディジタル信号は、外符号生成回路１１に供給され、ここで１トラックのデータ領域に記録されるシンクブロック分（第１の方式では図３のデータ領域３７の３０６シンクブロック分、第２の方式では図４のデータ領域４５の２７７シンクブロック分）入力されたときの誤り訂正符号として３０シンクブロックの外符号を示す。

【0031】ただし、外符号生成回路１１は、第２の方式では、２７７シンクブロック分の入力ディジタル信号に、図４の第１のデータ領域４１、ポストアンブル領域４２、ＩＢＧ領域４３及びプリアンブル領域４４からなる２９シンクブロックに相当する２９シンクブロック分の０データを加えた計３０６シンクブロック分のデータに対する外符号を生成する。この外符号は第１の方式のディジタル信号記録時には図３の誤り訂正符号領域３８に、また第２の方式のディジタル信号記録時には図４の誤り訂正符号領域４６に記録される。

【0032】このようにして、外符号生成回路１１により生成された外符号とデータ及びヘッダとからなるディジタル信号は、内符号生成回路１３に供給され、９９バイト単位で８バイトのパリティが内符号として生成される。なお、ヘッダ付加回路１０から取り出されたヘッダ及び補助信号は、外符号生成回路１２に入力されて１８シンクブロック毎に５シンクブロックの外符号が生成された後、これら２３シンクブロックの補助データが内符号生成回路１４に供給されて９９バイト単位で８バイトのパリティが内符号として生成される。

【0033】内符号生成回路１３及び１４でそれぞれ生成された内符号を含むディジタル信号（データ、ヘッダ、外符号及び内符号）は、付加回路１５にそれぞれ供給されて図２にＳｙｎｃで示した２バイトの同期信号やＩＤで示した３バイトのアドレス情報などが付加されてシンクブロックに生成された後、選択回路１６にシンクブロック単位で供給される。選択回路１６は制御回路６の出力選択信号に基づいて入力端子１に第１の方式の通常再生用データが入力されるときには、内符号生成回路１３及び付加回路１５をそれぞれ通して入力された第１の方式の通常再生データあるいは特殊再生用データを含むシンクブロックを選択し、入力端子２ａ及び２ｂにそれぞれ第２の方式の通常再生用データ及び補助信号が入力されるときには、内符号生成回路１３又は１４と付加回路１５をそれぞれ通して入力された第２の方式の通常再生用データあるいは特殊再生用データ、又は補助データを含むシンクブロックを選択する。

【0034】選択回路１６の出力信号は、信号記録回路１７で図３及び図４に示した領域３２、３３、３４、３９、４２、４４などに記録されるプリアンブル、サブコード、ポストアンブルなどが多重され、更に変調及び増幅された後、図示しない公知の回転ヘッドを用いた記録機構により記録媒体（ここでは磁気テープ）１８に記録される。これにより、図５に示したようなトラックパターンを形成して、通常再生用データ及び特殊再生用データＴＰ１～ＴＰ６が記録される。また、通常再生用データのデータレートに応じて特殊再生用データＴＰ１～ＴＰ６の一部又は全部に代えて通常再生用データが記録され

る。

【0035】なお、第２の方式のディジタル信号記録時には、入力端子２ａに入力した第２の方式の通常再生用データ及び特殊再生用データと、入力端子２ｂに入力した補助信号の一方のみを独立して記録できる。

【0036】次に、本発明の記録媒体の一実施例のトラックパターンについて図５と共に説明する。図５は＋アジマス角の第１の回転ヘッドと、－アジマス角の第２の回転ヘッドにより記録された２４ペアトラック（４８本のトラック）を示しており、また、各トラックのそれぞれは図３に示したデータ領域３７及び誤り訂正符号領域３８からなる３３６シンクブロック、あるいは図４に示した第１のデータ領域４１から誤り訂正符号領域４６までの３３６シンクブロックを示している。

【0037】図５からわかるように、特殊再生用データＴＰ１～ＴＰ６は予め定められた特定の位置に配置記録されているが、その記録範囲は、図４の第１のデータ領域４１の２３シンクブロック及び領域４２～４４からなる６シンクブロックの編集用ギャップと、３０シンクブロックの誤り訂正符号領域４６とを除く２７７シンクブロックの第２のデータ領域４５に設定されている。従って、第１の方式のディジタル信号記録時も図３の３０６シンクブロックのデータ領域３７のうち先頭の２９シンクブロックを除く２７７シンクブロックの範囲内の一部に特殊再生用データＴＰ１～ＴＰ６が記録される。

【0038】この実施例では、順方向４倍速（４×）の第１の特殊再生用データＴＰ１、順方向１２倍速（１２×）の第２の特殊再生用データＴＰ２、順方向２４倍速（２４×）の第３の特殊再生用データＴＰ３、逆方向４倍速（－４×）の第４の特殊再生用データＴＰ４、逆方向１２倍速（－１２×）の第５の特殊再生用データＴＰ５及び逆方向２４倍速（－２４×）の第６の特殊再生用データＴＰ６とが、予め定めた特定の位置に記録されている。

【0039】第１の特殊再生用データＴＰ１は４５シンクブロック、第２の特殊再生用データＴＰ２は４６シンクブロック、第３の特殊再生用データＴＰ３は１４シンクブロック、第４の特殊再生用データＴＰ４は５８シンクブロック、第５の特殊再生用データＴＰ５は２３シンクブロック、そして第６の特殊再生用データＴＰ６は１３シンクブロックから構成されている。これらの特殊再生用データのブロック長は、トリックプレイ時に回転ヘッドが若干のトラックずれが生じても再生できる長さに設定されている。

【0040】また、図５において、特殊再生用データＴＰ１～ＴＰ６が配置記録されていない部分は、通常再生用データが記録されているトラック部分を示す。更に、特殊再生用データＴＰ１～ＴＰ６のうちＴＰ２～ＴＰ６の白地で示した部分は、２回重複して記録されるシンクブロックを示す。

【0041】以上説明した図５のトラックパターンにおける上記の各特殊再生用データのシンクブロック数、記録データレート、再生データレートなどをまとめると次表に示すようになる。ただし、次表中、ＳＢはシンクブロックの略で、ここでは平均値として１ＳＢが９４バイトであるものとして計算してある。

【0042】

【表１】

倍速比	バースト/スキャン	SB(a)/スキャン	SB(b)/スキャン	記録SB/TPF	再生SB/スキャン	記録データレート(kbps)	再生データレート(kbps)
＋4	2	45	0	90	90	507.6	2.03
＋12	3	14	16	138	90	259.44	2.03
＋24	9	6	4	126	90	118.44	2.03
－4	2	32	13	116	90	654.24	2.03
－12	3	13	5	115	90	216.2	2.03
－24	9	7	3	117	90	109.98	2.03

なお、上記表中、ＳＢ（ａ）は特殊再生用データブロック中の重複して記録しないシンクブロック数、ＳＢ（ｂ）は特殊再生用データブロック中の重複して記録するシンクブロック数、ＴＰＦはトリックプレイフレーム、スキャンは回転ドラム等の回転体の１回転を意味する。図５のように、６種類の特殊再生用データＴＰ１～ＴＰ６をすべて表１のように記録したときには、全特殊再生用データが毎秒２４８１．２５ＳＢの割り合いで記録されるから、全記録データ量（６０×３０６（ＳＢ／ｓ））の中で占める割合が１３．５％となる。このときの通常再生用データの記録可能なデータレートは１１．９Ｍｂｐｓである。

【0043】本実施例では、通常再生用データのデータレートが変わることがあることを前提としており、通常再生用データのデータレートが１１．９Ｍｂｐｓよりも高くなった場合は、それに応じて特殊再生用データの記録データ量を削減するものである。この削減の仕方としては、例えば、特殊再生用データＴＰ１～ＴＰ６のうち再生に際して優先順位の低いものから削減する方法がある。

【0044】この場合は、例えば、２４倍速の特殊再生用データＴＰ３及びＴＰ６が最も優先順位が低く、以下、逆

方向４倍速の特殊再生用データＴＰ４、順方向４倍速の特殊再生用データＴＰ１、逆方向１２倍速の特殊再生用データＴＰ５、順方向１２倍速の特殊再生用データＴＰ２の順で優先順位が高くなっていくものとすると、通常再生用データのデータレートが１１．９Ｍｂｐｓよりも高くなるにつれて、①ＴＰ３及びＴＰ６、②ＴＰ４、③ＴＰ１、④ＴＰ５、⑤ＴＰ２の順で特殊再生用データの記録を省略し、最終的には特殊再生用データの記録をすべて省略して通常再生用データのみを記録する。

【0045】この場合の、記録される特殊再生用データと、特殊再生用データが占める割合と、記録可能な通常再生用データのデータレートとをまとめて示すと、次表のようになる。

【0046】

【表２】

記録される特殊再生データ	特殊再生データが占める割合（％）	記録可能な通常再生データレート（Mbps）
無し	0	１３．８
TP2	１．９	１３．５
TP2, TP5	３．４	１３．３
TP2, TP5, TP1	７．１	１２．８
TP2, TP5, TP1, TP4	１１．９	１２．２
TP2, TP5, TP1, TP4, TP3, TP6	１３．５	１１．９

ただし、上記の表２中、記録再生可能な通常再生データレートは、第１のフォーマットで記録される第１の方式の入力通常再生用データのデータレートであり、第２のフォーマットで記録される第２の方式の通常再生用データはこれよりも約１．３１Ｍｂｐｓ（＝（２３＋６）ＳＢ／トラック×６０トラック／ｓ×９４Ｂｙｔｅ／ＳＢ×８ｂｉｔ／Ｂｙｔｅ）少なくなる。

【0047】本実施例では、第１の方式のディジタル信号及び第２の方式のディジタル信号のどちらを記録する場合も、特殊再生用データＴＰ１～ＴＰ６に必要なデータ量は同じ種類の特殊再生用データの場合は同一であるので、特殊再生用データを生成するトリックプレイデータ生成回路７を第１及び第２の方式のディジタル信号記録に共用でき、よって回路を簡略化できる。

【0048】また、本実施例では、第１の方式のディジタル信号及び第２の方式のディジタル信号のどちらを記録する場合も、図５に示したように、特殊再生用データＴＰ１～ＴＰ６の記録配置位置が固定であるため、トラック上に特殊再生用データＴＰ１～ＴＰ６を配置記録するための回路の負担が一通りで済む。

【0049】次に、本発明の記録媒体を再生するディジタル信号再生装置の構成及び動作について図６と共に説明する。記録媒体５１は上記の記録媒体１８と同様の図５のトラックパターンを有する記録媒体で、その記録ディジタル信号は公知の再生機構（ここでは回転ヘッドを含む機構）により再生された後、信号再生回路５２により増幅及び復調され、ＩＤ検出回路５３によりそのアドレス情報（ＩＤ）が検出される。ＩＤ検出回路５３は検出したＩＤに基づいて、図３のデータ領域３７及び誤り訂正符号領域３８からの再生ディジタル信号、あるいは図４のデータ領域４５及び誤り訂正符号領域４６からの再生ディジタル信号は誤り訂正回路５４に供給し、図４のデータ領域４１からの再生ディジタル信号は誤り訂正回路５５に供給する。

【0050】誤り訂正回路５４により誤り訂正された再生ディジタル信号は制御回路５６に供給される一方、データ振り分け回路５７に供給される。また、誤り訂正回路５５に供給された再生ディジタル信号は誤り訂正された後ＡＵＸ用バッファメモリ５８に供給される。

【0051】制御回路５６は再生ディジタル信号のヘッダを解析してデータ振り分け回路５７の制御信号を発生すると共に、バッファメモリ５９－１～５９－６及びノーマル用バッファメモリ６０並びにＡＵＸ用バッファメモリ５８の書き込み制御信号ＷＴＰ１～ＷＴＰ６及びＷＮ並びにＷＡを発生し、かつ、再生ディジタル信号中の４バイトの付加情報（アディショナルヘッダ）を解析して、データ到着時刻を参照し、同じタイミングでデータを読み出すように読み出し制御信号ＲＴＰ１～ＲＴＰ６及びＲＮ並びにＲＡを発生する。

【0052】データ振り分け回路５７は、上記制御信号に基づいて入力再生ディジタル信号が特殊再生用データＴＰ１～ＴＰ６であるときはそれぞれ専用のバッファメモリ５９－１～５９－６に振り分けて供給し、通常再生用データのときにはノーマル用バッファメモリ６０に供給する。特殊再生用データＴＰ２～ＴＰ６については重複して記録された２個所の特殊再生用データの複数のデータブロックのうちの一方のみを選択して出力する。従って、ヘッド走査軌跡が若干ずれても特殊再生用データを好適に再生することができる。

【0053】特殊再生用データＴＰ１～ＴＰ６のそれぞれに専用に設けられたバッファメモリ５９－１～５９－６に格納された特殊再生用データと通常再生用データ専用のバッファメモリ６０に格納された通常再生用データとは、制御回路５６からの読み出し制御信号ＲＴＰ１～ＲＴＰ６及びＲＮに基づいて読み出され、選択回路６１に入力される。選択回路６１は制御回路５６により指定さ

れた一の種類のデータを選択して再生データとして出力する。一方、補助信号再生時には制御回路５６からＡＵＸ用バッファメモリ５８に読み出し制御信号ＲＡが供給され、これによりバッファメモリ５８から再生補助信号が出力される。

【0054】なお、本発明は上記の実施例に限定されるものではなく、例えばディジタル信号は２つの方式のフォーマットのいずれかのフォーマットで記録し再生するように説明したが、３つ以上でも特殊再生用データをすべての方式に共通する範囲内の一部に記録することにより本発明を適用することができる。

【0055】また、上記の実施例では、方式検出回路４により第１の方式か第２の方式かを検出しているが、方式の検出は自動検出に限らず手動で検出することもできる。また、特殊再生用データは通常再生用データから生成するように説明したが、別途生成して入力することもできる。

【0056】

【発明の効果】以上説明したように、請求項１及び３記載の本発明のディジタル信号記録方法及び記録装置によれば、第１及び第２のフォーマットのいずれの記録時にも特殊再生用のディジタル信号の記録エリアを同一にできるため、トラック上に特殊再生用ディジタル信号を記録配置する回路を各フォーマット記録時で共通化でき、回路構成の簡略化に有効である。

【0057】また、本発明によれば、特殊再生用ディジタル信号は第１及び第２のフォーマットによる記録時のいずれの場合も同一構成であり、必要とされる特殊再生用ディジタル信号のデータ量を同一にできるため、特殊再生用ディジタル信号を生成するための回路を共用化でき、回路構成の簡略化に有効である。

【0058】また、請求項２及び４記載の本発明のディジタル信号記録方法及び記録装置によれば、通常再生用ディジタル信号のデータレートに応じて、特殊再生用のディジタル信号記録エリアに特殊再生用のディジタル信号及び通常再生用のディジタル信号の一方を選択して記録するようにしたため、特殊再生用ディジタル信号を配置するための回路（アドレッシング等）の切り換えが不要にでき、回路の負担を大幅に減ずることができる。

【0059】更に、請求項５記載の本発明の記録媒体によれば、各トラックの第１及び第２のフォーマットで共通するディジタル信号記録領域内の予め定めた特定のエリアに通常再生用ディジタル信号に代えて特殊再生用のディジタル信号が配置記録されるため、再生装置ではどのフォーマット再生時にも同じ領域から特殊再生用のディジタル信号を再生することができる。

【図面の簡単な説明】

【図１】本発明になるディジタル信号記録方法及び記録装置の一実施例を説明するための記録装置のブロック図である。

【図２】本発明により記録されるデータブロックの一例のフォーマットを示す図である。

【図３】本発明により形成される第１の方式のトラックフォーマットの一例を示す図である。

【図４】本発明により形成される第２の方式のトラックフォーマットの一例を示す図である。

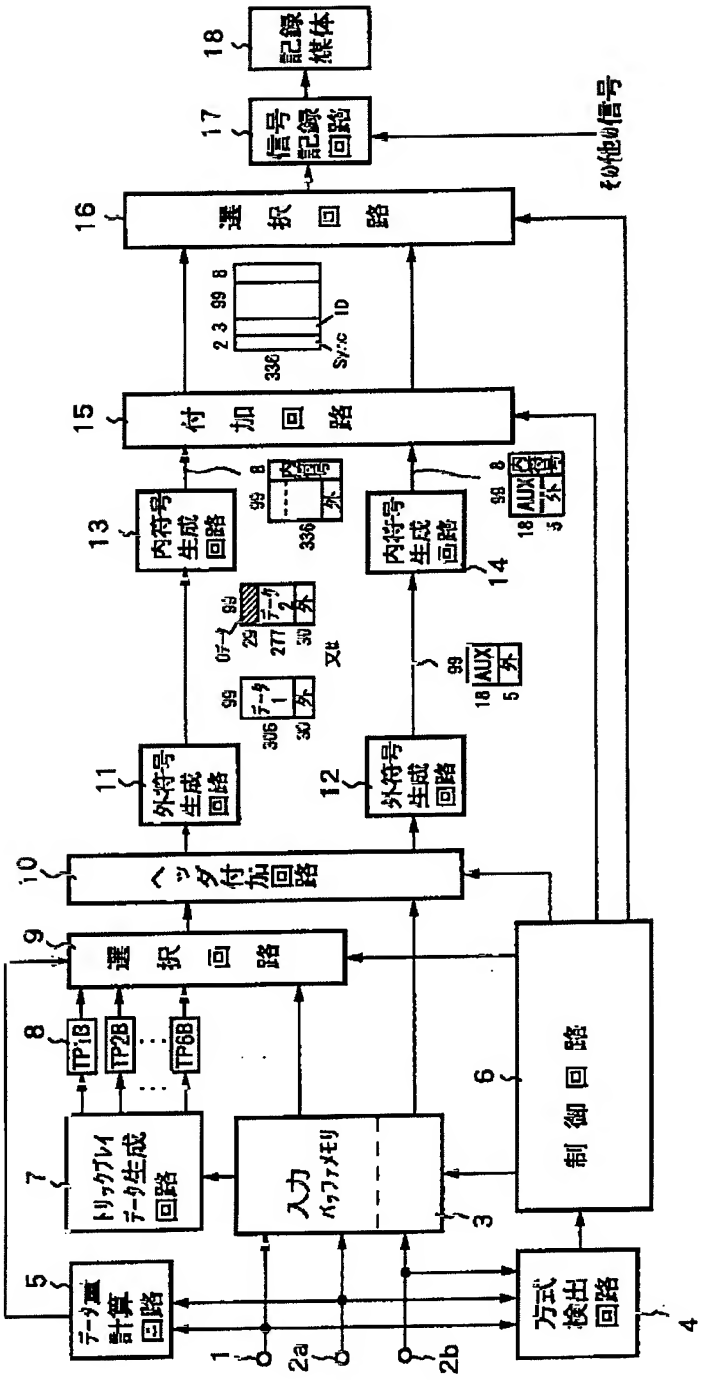
【図５】本発明になる記録媒体の一実施例のトラックフォーマットを示す図である。

【図６】ディジタル信号再生装置の一例のブロック図である。

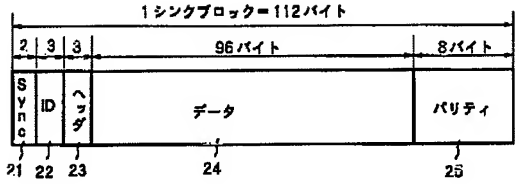
【符号の説明】

１　第１の方式の通常再生用データ入力端子
２ａ　第２の方式の通常再生用データ入力端子
２ｂ　第２の方式による補助信号入力端子
３　入力バッファメモリ
４　方式検出回路
５　データ量計算回路（検出手段）
６　制御回路（第１及び第２の選択手段、付加手段）
７　トリックプレイデータ生成回路
８　バッファメモリ
９　選択回路（第１の選択手段）
１０　ヘッダ付加回路（付加手段）
１１、１２　外符号生成回路
１３、１４　内符号生成回路
１５　付加回路
１６　選択回路（第２の選択手段）
１７　信号記録回路
１８、５１　記録媒体
２４　データ格納領域
３７　データ領域
３８、４６　誤り訂正符号領域
４１　第１のデータ領域
４５　第２のデータ領域
ＴＰ１～ＴＰ６　特殊再生用データ

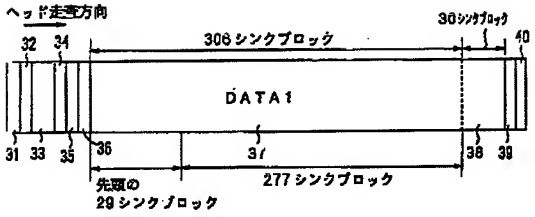
【図1】


18
記録媒体
17
信号記録回路
その他の信号
16
選択回路
15
付加回路
13
内符号生成回路
14
内符号生成回路
11
外符号生成回路
12
外符号生成回路
10
ヘッダ付加回路
9
選択回路
8
TP1B
TP2B
TP6B
7
トリックプレイデータ生成回路
入力バッファメモリ
3
6
制御回路
5
データ量計算回路
方式検出回路
4
1
2a
2b
Sync
ID
AUX
外符号
内符号
データ1
データ2

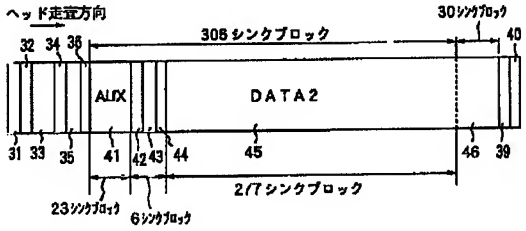
【図2】


1シンクブロック＝112バイト
2
3
3
96バイト
8バイト
Sync
ID
ヘッダ
データ
パリティ
21
22
23
24
25

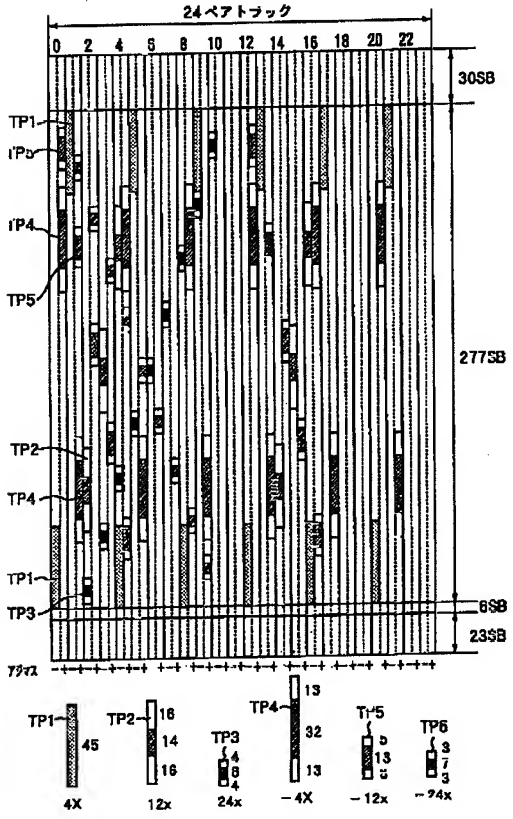
【図3】


ヘッド走査方向
30シンクブロック
32
34
306シンクブロック
40
DATA1
31
33
35
36
37
38
39
先頭の
29シンクブロック
277シンクブロック

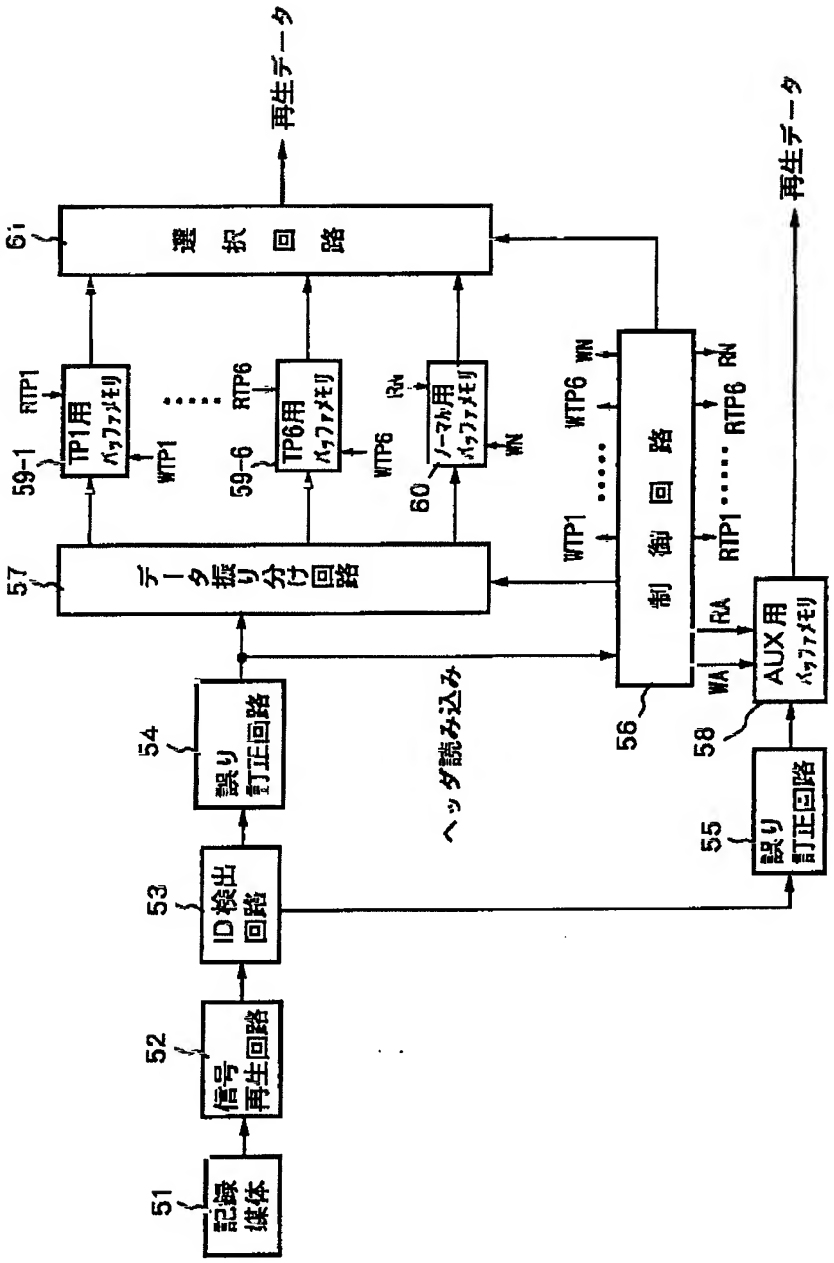
【図4】


ヘッド走査方向
30シンクブロック
32
34
36
306シンクブロック
40
AUX
DATA2
31
33
35
41
42
43
44
45
46
39
277シンクブロック
23シンクブロック
6シンクブロック

【図5】


24ペアトラック
0
2
4
6
8
10
12
14
16
18
20
22
30SB
277SB
6SB
23SB
TP1
TP2
TP4
TP5
TP3
TP6
アジマス
45
4X
16
14
16
12x
4
8
4
24x
13
32
13
−4X
5
13
8
−12x
3
7
3
−24x

【図6】


再生データ
61
選択回路
59-1
TP1用バッファメモリ
RTP1
WTP1
59-6
TP6用バッファメモリ
RTP6
WTP6
60
ノーマル用バッファメモリ
RN
WN
57
データ振り分け回路
54
誤り訂正回路
53
ID検出回路
52
信号再生回路
51
記録媒体
ヘッダ読み込み
56
制御回路
WTP1 ..... WTP6 WN
RTP1 ..... RTP6 RN
RA
WA
58
AUX用バッファメモリ
55
誤り訂正回路
再生データ